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**PHILIPPINES**

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INFINITY 2 LITE

**ANICKA LYKA YU**

## SMARTPHONE TECHNOLOGY WHAT EXACTLY MAKES YOUR PHONE SMART?



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WITH THE  
LG G4**



**MECHANICAL  
GAMING  
KEYBOARD  
COMPARISON**

**REVIEWED: HTC ONE M9, JBL CHARGE 2, FUJIFILM X-A2, AND A WHOLE LOT MORE!**

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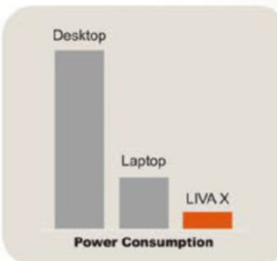
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**Power Extension**  
WiFi streaming options to  
extend facility



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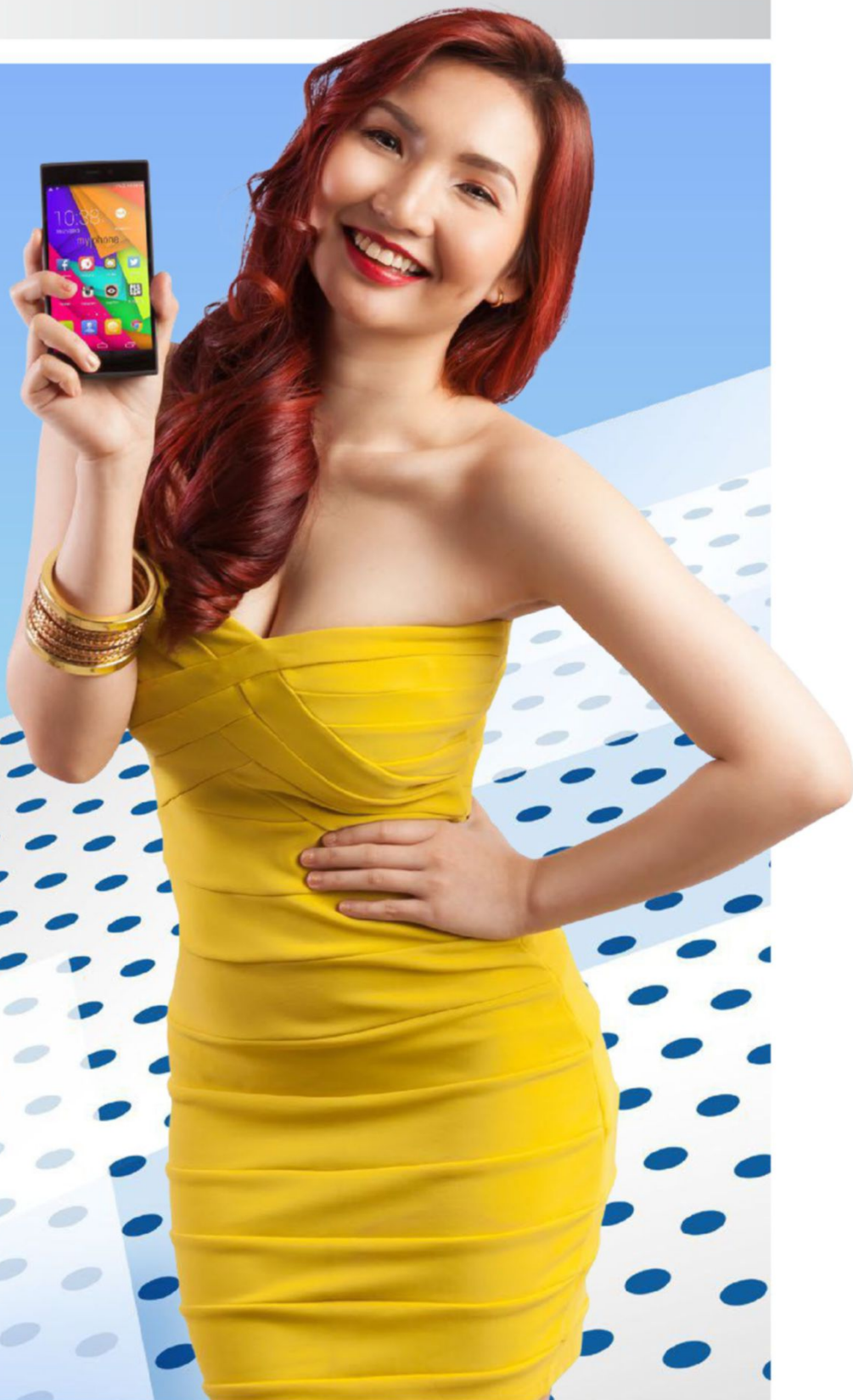
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**ERRATUM:** The HWM Team would like to apologize for an error in the June 2015 issue of HWM Philippines. On page 34, the product displayed is actually of the Philips A5-PRO and not of the Philips A3-PRO. You can find the Philips A5-PRO and its accompanying description on page 34 of this issue.





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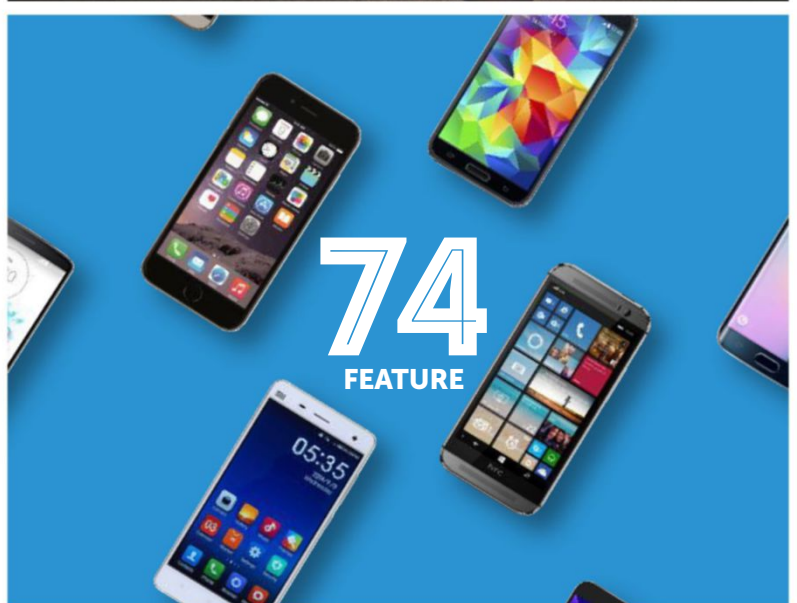
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## SUBSCRIPTION PRIZE

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TDK WR700 Headphones





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# ED'S NOTE

J U L Y  
2 0 1 5

## THE NET OF STUFF

The most hyped tech term we've been hearing in every major event recently is the Internet of Things, also known as IoT. It sounds simple on the surface (it basically refers to the interconnectivity of everything around us through the Internet), but it holds much greater importance once you look at the big picture.

The Internet of Things isn't just about sharing cat photos from your smartphone to your neighbor's refrigerator; it involves getting absolutely everything connected, from the light bulbs in your room to the collar of your dog, in order to make life seamless and, ultimately, much safer. Unfortunately, proprietary connections and exclusive patents hold back the IoT's progress, much like how we still don't have a universal charger for absolutely every gadget yet. (Although, we're getting closer, thanks to USB-C.)

A parallel trend that's been popping up at tech conventions is platform invasion between major companies. Recently, Apple made its music streaming service – aptly named Apple Music – available to Android users. This seems unlike anything Apple would ever do, but the Cupertino company is smart enough to admit that Android's user base is massive, and it's a fantastic opportunity for Apple's services to expand without sacrificing its brand recognition. Microsoft did something similar not too long ago, making its Office applications available outside of its own ecosystem. These small yet significant strides are bringing us closer to the true potential of the omnipresent network we call the Internet.

For now, let's lighten up the mood with some easy reading over at page 52 with our cover model, Anicka Lyka Yu, plus some more information about the mobile takeover beginning on page 82. Enjoy!

## The HWM Team

Comments about this issue? Suggestions? The HWM Team would love to hear from you! Send us your thoughts at [editor.ph@hwzcorp.com](mailto:editor.ph@hwzcorp.com).





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# PHILIPS

THINK

# THE THREATS AROUND EVERY CORNER

■ The Internet landscape has changed, and as we move to the age of connected devices and information sharing, so too have threats evolved.

Text by *Koh Wanzi + Marcus Wong*

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# EVERYONE'S PHISHING IN THE CLOUD

Like it or not, the security of your information is no longer in your hands.

Whether you like it or not, we're living in a new world. And in this new world, everyone from individuals to corporations is plugged into the great big grid of networked computing we call the Cloud.

Resources that were once exclusively bought and maintained by large corporations are now being made available on a pay-as-you-use basis by third-party providers, meaning that not only do companies no longer need to have their own technical resources, employees also no longer have to be in the "office" to access them.

After all, why pay for a building to house staff when your staff could just as easily be working from their homes? For that matter, why have an overseas branch when you could just have employees working in their native countries? Remote computing is the new paradigm for the business world, and that means all sorts of data is increasingly becoming available everywhere.

That's something that hasn't been lost on cybercriminals either. After all, why spend the time and effort to hit ten companies when you can hit the Cloud service provider that holds all their data? That's why security is likely to become the number one priority – and differentiating factor – for Cloud service providers like Amazon, Google, and Microsoft.

This also means that soon everything that's connected to the Cloud in one way or another becomes a battleground on which Cloud service providers and their security teams try to outdo each other and hackers in discovering and fixing (or exploiting) vulnerabilities.

Can we trust these agencies to be altruistic in reporting their findings? After all, Google's Project Zero has already famously drawn the ire of Microsoft for posting about a vulnerability in Windows 8.1 before they were able to issue a relevant patch, and the Project Zero team doesn't seem like they'll be changing their modus operandi anytime soon.

Either way, it seems the capabilities of the respective Computer Emergency Response Teams will very much be the key differentiating factor between Cloud service providers as more and more of our essential services move online. The war for our information is looming, so it's imperative we pick wisely to ensure our information isn't lost in the crossfire.





# BIG DATA IS BIG BUSINESS

Everyone is a target when all your information holds value.

■ Forget Bitcoin. The true currency of the Internet has and always will be data. And with more and more government and commercial organizations tapping into the Cloud to share data and resources, the stream of information that becomes Big Data simply grows exponentially everyday. Which means the value of Big Data is increasing every day.

In fact, Microsoft estimates that governmental organizations taking advantage of Big Data have the potential to raise additional revenue of about US\$ 206 billion, while financial service institutions and related companies have the potential to gain more than US\$ 308 billion in value just from data alone. NEC estimates that by 2020, there will be about 8 billion people in the world, and about 50 billion connected devices, all sharing information with and about each other.

So the value of Big Data is certainly becoming more evident to all, including criminals. Indeed, what security agencies like Interpol, Kaspersky Lab, and Microsoft's Digital Crimes Unit are finding is that hackers and your traditional "real world" crime organizations are increasingly starting to work together. So much so, that they contend that there's no such thing as "cybercrime" anymore – just "crime."


Traditional crime organizations might hire hackers to steal enterprise information so they can blackmail a particular company, for example, while hackers might hire street thugs to collect cash spat out by ATM machines after they've hacked a bank's network. The obvious synergy for these two groups may perhaps be best seen in a recent attack on a shipping port in Amsterdam, where criminals used hackers to take over the port's systems and used it to load heroin onto ships bound for safe destinations of their choosing.

So, with Big Data becoming more and more valued, it's only obvious that this will be the next hunting ground for criminals. After all, connected devices are everywhere, and data is being collected from every single one of them. That fancy new smartwatch is just another opening to the server it sends data back to. And why try to hack a bank server's security when you can just take over the banking app on the unsecured mobile phone of one of its customers?

While securing the Cloud is a task that falls mainly on the shoulders of the organizations that build, maintain, and run the multitude of servers that enable the Cloud as we know it, it does seem that perhaps the responsibility to ensure that the security of Big Data is maintained will fall on every single one of us.

# THE INTERNET OF THREATS

In an age when even our devices are getting social, everything connected is at risk.

 We usually think of social networking as comprising mainly of people. Networks like Facebook, Twitter, and LinkedIn exist primarily to connect people to each other, but social networking is gradually expanding beyond people to include a network of applications, devices, and products. The Internet of Things (IoT) is fast becoming an integral aspect of new social networking trends, but these emerging networks of people, apps, and devices bring with them their own share of security risks.

For instance, Devin Redmond, vice-president and general manager of Proofpoint's Nexgate division, notes that "Company-affiliated social pages, profiles, and accounts are the next big attack surfaces for fraud, phishing, hacking, and data theft." Nexgate's 2014 report on security threats to the social infrastructure of Fortune 100 companies found that the primary purpose of social media threats was to steal customer data, damage the brand, manipulate markets, and perpetrate various Internet scams.


Cybercriminals will target platforms where people congregate, and social media platforms open up lucrative opportunities for them to exploit. Symantec's 2015 Internet Security Threat Report cited an increase in manual sharing scams, where people voluntarily and unknowingly shared videos, stories, or pictures that included links to malicious sites. Social networks provide fertile ground for these sharing scams, and attackers only have to plant to seed and let the network do the rest of the work. They take advantage of the power of "social proof," where people tend to attribute more value to something that has been shared or approved by others.

Similarly, IoT devices are equally vulnerable to attacks by cybercriminals. The IoT comprises social networks of connected devices that span a diverse range and are subject to an equally vast variety of threats. For example, the surge of wearable devices poses security and privacy threats to its users. In a review of the 100 health apps in the Apple App Store, it was found that 20% transmitted unencrypted user credentials and 52% did not have any privacy policies. Users risk exposure of personal data from health-monitoring devices, and could even be tracked without their knowledge via intercepted location data.

More than ever, there is a need for greater awareness of measures to secure social media infrastructures – encompassing user accounts, applications, and devices – and more robust solutions to protect data and fend off attackers. In Eugene Kaspersky's words, "The IoT is the Internet of threats for us." It's time we sat up and took notice in order to reap the benefits of social media and connected devices while neutralizing potential threats.

# MOBILITY IS A DOUBLE-EDGED SWORD

With greater flexibility comes a greater set of concerns.

 The threat landscape is shifting around us. Mobile trends are on the rise, opening up a world of opportunities for consumers and businesses alike. But it's not all a bed of roses, and today we're experiencing a revolution of cyber threats that have mobile devices squarely in their crosshairs. As Mark Bermingham, Global Director of Product Marketing at Kaspersky Lab aptly puts it, "As consumers and businesses shift to using mobile devices for a greater percentage of their daily activities, cybercriminals will place a larger emphasis on targeting these platforms – specifically Android and jail-broken iOS devices."

Mobile security company Lookout found a staggering 75% increase in Android mobile malware encounter rates in the US compared to 2013. The rise of mobile devices in the workplace and the growing popularity of Bring Your Own Device (BYOD) programs have also exposed companies to multiple points of vulnerabilities. A single infected device can compromise an entire network, making it more important than ever for enterprises to implement solutions that will be able to protect company and employee data both in and out of the office.

Companies who have embraced the additional flexibility of mobile devices will need more robust solutions to secure communications from a plethora of devices, data, and file syncing and sharing. BlackBerry, formerly the go-to device for secure mobile devices for businesses, is looking to reclaim its position in the security landscape by acquiring document security firm WatchDox. Recognizing that enterprises need secure mobile solutions to enable employees to collaborate more effectively, BlackBerry now aims to unite WatchDox's data-centric security with its user-friendly experience to create a comprehensive mobility solution for today's organizations.

And it's not just data that's at risk. The proliferation of mobile payment solutions like Apple Pay, Google Wallet, and Samsung Pay potentially expose millions of



customers, banks, and retailers to payment fraud. Google Wallet suffered from revelations that unauthorized users could gain access to funds in the account, which forced Google to temporarily disable provisioning of prepaid cards while it worked to fix the issue. Cybercriminals have continually targeted vital data like credit card information – US retail giant Kmart admitted to a breach in its payment systems last year – and the growth of mobile payment systems represent fertile ground for hackers to exploit.

Last year, the number of mobile devices officially surpassed the number of people on the globe according to GSMA Intelligence's real-time tracker. There is no holding back the mobile age, and it's up to enterprises, security companies, and consumers to do exercise due diligence and take the necessary steps to hold back the tide of opportunistic cybercriminals.





WELCOME TO THE

# *Internet of Everything*

*Every day, the Internet of Everything grows exponentially. Millions of devices and people are connecting, developing ideas and solutions that are the first of their kind. But these firsts are only truly interesting for the lasts they create. The last traffic jam. The last product recall. The last blackout. These are what motivate us, because we know big things are never achieved by thinking small. And those big things start here and now.*

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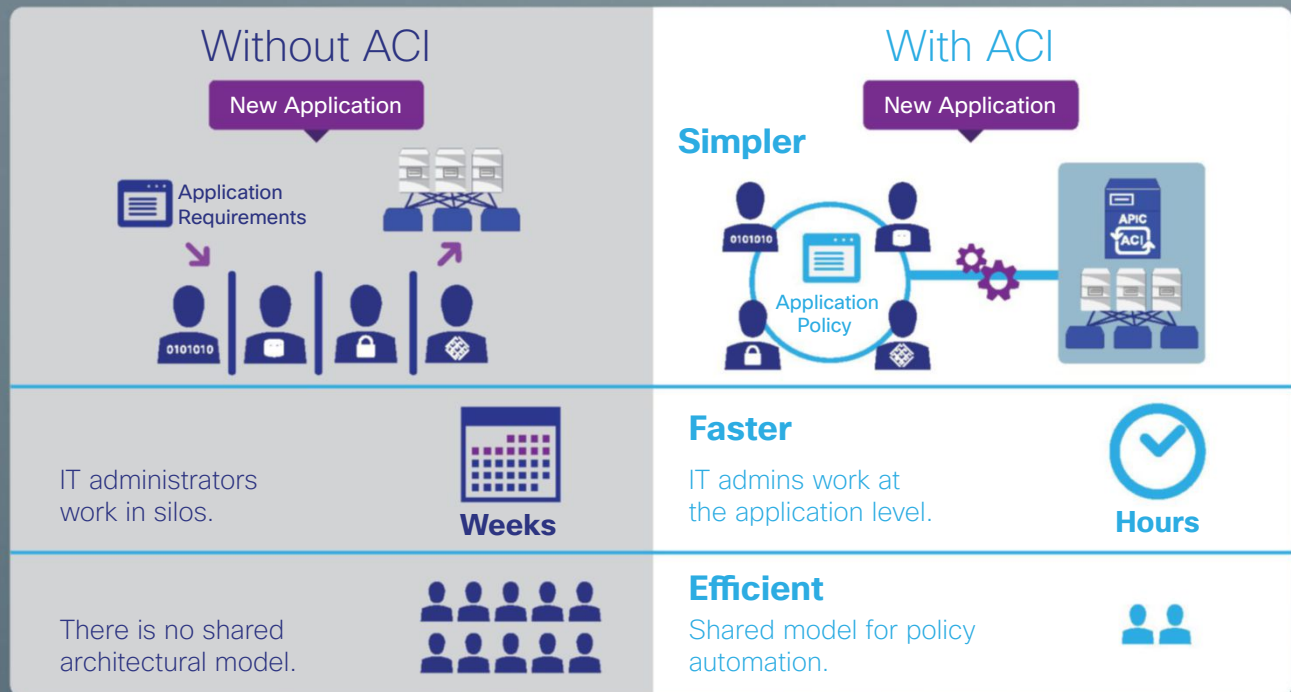




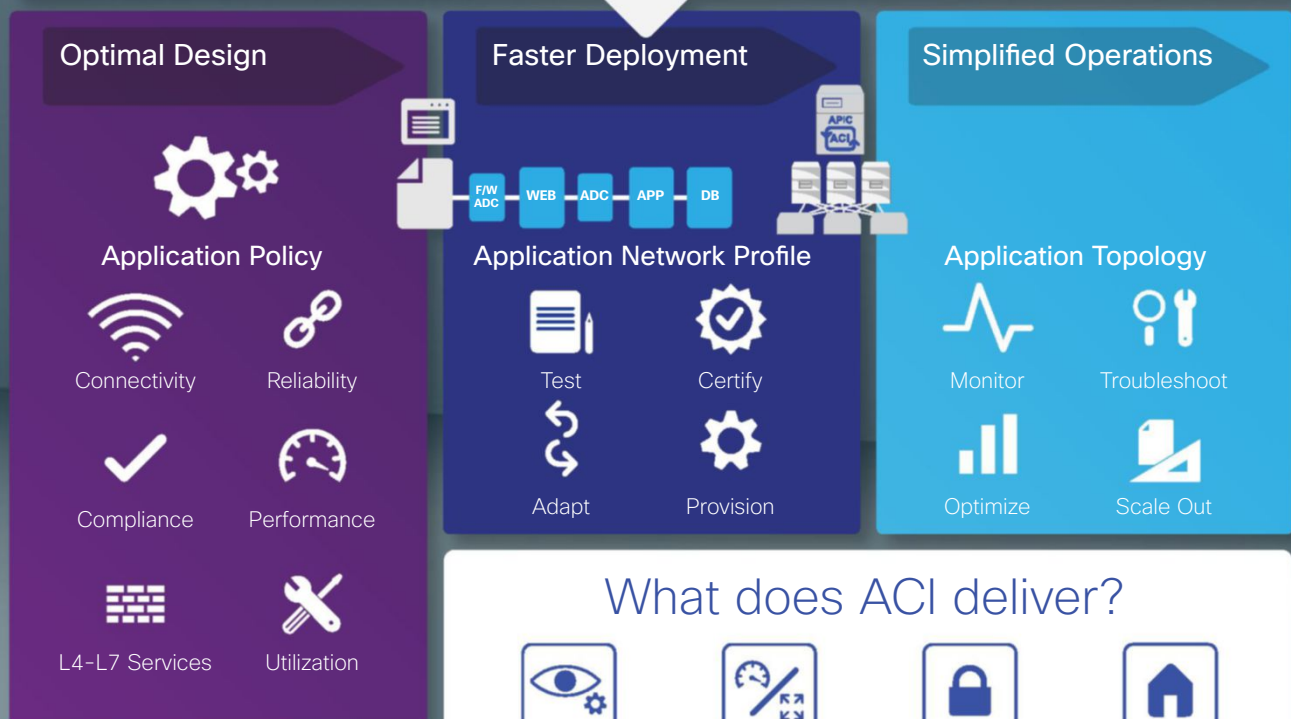
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PICTURE ZACHARY CHAN

# CONNECTIVITY DRIVING CONSUMER ELECTRONICS

Otherwise known as smartphones, the one device to rule them all.

by Zachary Chan

Messe Berlin, the organizers of IFA in Berlin, normally holds a pre-show press conference to talk about the changing trends of the consumer electronics market in Europe as well as the world. This year, the IFA GPC was held in Malta, and the key takeaway was that connectivity will remain the main driver for innovation in the industry for 2015 and well into 2016.

Analysts from GfK showed that sales of mobile Internet devices will continue to grow worldwide. In 2010, 59 million smartphones were sold across the APAC region. In 2014, this number rose astronomically to 625 million units. Everyone wants a piece of this pie. In 2010, there were 16 smartphone brands. In 2014, there were 90.

GfK estimates China alone will account for almost as much as all of North America and Europe combined with 408 million smartphones sold in 2015. This is in contrast to North America with 198 million, Western Europe with 140 million, and Central/Eastern Europe with 83 million for a total of 421 million. And to cement a trend we know has been coming, tablet sales have basically stagnated for the past two years and are estimated to decline this year.

What's interesting, though, is that while GfK's numbers show a demand for mobile Internet devices, the overall picture isn't quite so rosy. If we were to zoom back in on the APAC market reports, comparing year-to-date 2014 with 2013, every category saw a decline. Consumer electronics is down by

7% to 30 billion USD, and Information Technology is down by 7% to 80 billion USD; camera and photography saw the largest decline of 20% and is also the smallest industry valued at 8 billion USD. The only category that didn't record a

loss is also the largest, which is no surprise to anyone, was telecommunications at 158 billion USD. However, it didn't record a growth either; the market was flat.

While there are definite factors that contributed to this decline over the past two years, such as market saturation and price erosion, it is the changing of consumer behavior, driven by increased connectivity that's influencing spending. What we're really seeing is that as other industries shrink, the smartphone steps in to fill that gap. Or if you look at it from another perspective, as the smartphone takes over the capabilities of yet another dedicated device, that industry starts to shrink.

Social networking, photo, video, music, travel, news, productivity, navigation, shopping, healthcare, fitness... you name it, and the smartphone is at the heart of it all.

So yes, connectivity now drives innovation in every category, not just in consumer electronics, but also domestic appliances. Every new smart product shouldn't just be able to connect to the Internet or offer online services, they should be driven by apps and connected to an expanded ecosystem, and by that, we mean your smartphone.

*"It is the changing of consumer behavior, driven by increased connectivity that's influencing spending."*



# DOCTOR SELFIE

by Koh Wanzi

**■** New research from scientists at the Massachusetts General Hospital suggests that smartphones could potentially be used as an early diagnostic tool for diseases like cervical cancer.

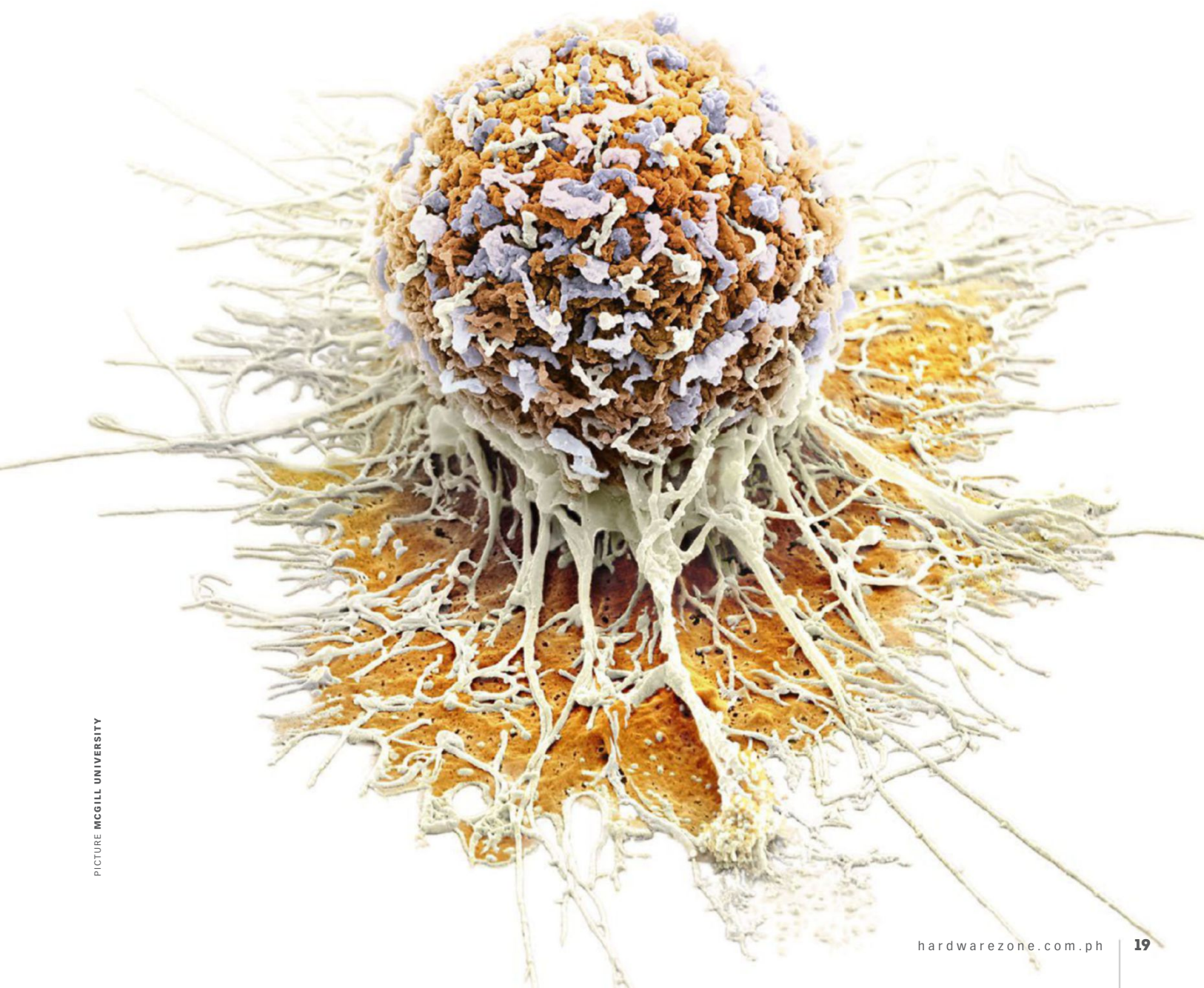
The new technology is based on digital holography, which constructs 3D images of cells using a device that clips onto any smartphone. Cell samples are inserted into this device and light is then shone onto the sample, which returns unique patterns of diffracted light that are, in turn, detected by the phone's camera.

This is made possible by the addition of microbeads, which bind to specific molecules – like cancer markers or HPV DNA – and alter their diffraction pattern. A higher prevalence of disease markers will mean more microbeads binding to them. Your phone sends the resulting diffraction

pattern to a computer to reconstruct an image of the cells in the sample. The computer then sends the image and results back to your phone. The entire process is estimated to cost only US\$ 1.80 and will take just 45 minutes.

The microbeads can be modified to bind to different molecules to enable diagnosis of various infectious diseases and other types of cancer. The technology has already been tested with cervical and blood cancer markers and HPV.

Given that health-screening for diseases can often be time-consuming and costly, this new technology could see the greatest impact in low-income countries with poor access to healthcare. It could even benefit more developed nations, where a blood sample from a pricked finger could enable speedy home diagnoses.





See the Great, Feel the Great

LG G4

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LG Mobile Product Manager Faith Mjlares (7th from left), LGEPH Managing Director Mr. Sung Woo Nam (10th from left) and LGEPH Mobile VP Mr. Jay Won (4th from right) with renowned personalities. (L-R): PBA legend Alvin Patrimonio; award-winning conceptual photographer Niccolo Cosme; director and musician RA Rivera; Gilas Pilipinas stalwarts Japeth Aguilar and LA Tenorio; Azkals superstars Simon Greatwich, Chris Greatwich and Anton del Rosario; Bb. Pilipinas Miss Universe 2015 Pia Wurtzbach; power celebrity couple Aubrey Miles and Troy Montero; supermodel and businesswoman Milkaela Lagdameo with husband and golfer Chucho Martinez; Kapamilya entertainment news personality MJ Marfori; fast-rising young photo blogger Kimi Juan and young actress and model Gwen Zamora.

# Discover Greatness with the LG G4

It's finally here! After launching in six big cities around the world, including New York, London, Paris, Singapore, Istanbul, and Seoul, the LG G4 has finally landed in the Philippines to let Filipinos see and feel its greatness.

Through a grand launch that happened at The Theater at Solaire Resort and Casino in Manila, LG has let its guests feel the striking features of the G4, highlighting its stunning design that is defined by the Slim Arc, which runs along its entire body, put into spotlight by its impressive display that flaunts a slight curvature.

What makes the G4 unique is its hand-crafted back cover that is made of luxurious and environment-friendly genuine leather (available in black, brown, and red), but if you want other options, you can go for metallic gray, shiny gold, and ceramic white.

LG's latest flagship smartphone sports a 5.5-inch IPS Quantum display, calibrated for DCI (Digital Cinema Initiatives) standards. The higher-quality display is complemented with a high-capacity 3000mAh removable battery, letting you experience greatness with enough power.

It is powered by a 1.8GHz Hexa-Core Qualcomm Snapdragon 808 processor and runs on Android 5.0 Lollipop. It also has 3GB of ROM and 32GB of internal storage.

The LG G4 takes astounding photos and videos through its 16-megapixel rear camera that has an f/1.8 aperture, complemented by Color Spectrum Sensor (CSS) technology that improves color accuracy. Selfies and groupies have also become more vibrant with its 8-megapixel front-facing camera with f/2.0 aperture.

With OIS 2.0, which doubles the performance of OIS+, the G4 can capture great images in low-light conditions. It also allows users to shoot in Manual mode that is similar to DSLR functionality. In addition to JPEG, the G4 lets advanced photographers save their photos in RAW format. In addition, the G4 is said to be capable of producing 80 percent brighter and 40 percent larger images compared to the other smartphones that are now available in the market.

The LG G4 is now available in the Philippines at an SRP of PHP 32,990 for the leather variant and PHP 31,990 for the metallic and ceramic variants.







IF THE ELEMENTS DON'T GET YOU, THE ISOLATION WILL.

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## Android Is the New TV



Sony is bringing Android to the living room with its latest line of BRAVIA televisions. Powered by Google Android TV, the new line comes with a host of intuitive features that highlights the latest Android 5.0 Lollipop operating system. With it, users can now easily input voice searches and download apps on their televisions through Google Play, just like on a smartphone. As for screen resolutions, four models support 4K (X9400C, X9000C, X8500C, and X8300C), while the W800C provides Full HD.



## Keeping It Fast

As consumers become more dependent on their mobile devices, SanDisk unveiled a new line of mobile memory solutions to help consumers keep up with the demands of today's mobile-centric world. The latest offerings include the SanDisk microSD card, iXpand flash drive, Ultra dual-USB drive, and dual-USB drive with Type-C connector – all set to provide consumers the liberty to capture, save, share, and transfer files in fast speeds.



## A New Boom



BoomPods, one of the latest booming gadget brands in the country, has finally made its way to the Philippine market. BoomPods aims to challenge itself and provide consumers with unique audio products, including a downward-facing rechargeable speaker, a wireless portable speaker with a 3-watt speaker and passive subwoofer technology, wireless compact travel headphones, sports earphones, and portable phone chargers. Customers can now purchase its latest offerings at Lazada Philippines.



## Let's Hang Out!

As we move at maximum speed, trying to keep up with the demands of the modern world, the idea of hanging out seems to be always out of reach, but with Lenovo's new "Hangout" campaign, spending quality time with each other couldn't be any better and easier! In a hangout session at Vyne, BGC, Lenovo launched its Hangout campaign, along with its ambassadors, beauty queen MJ Lastimosa and model Markki Stroem.



## Sneak Peek



RedFox Technologies recently gave a teaser of its latest line of innovative products at a kickoff party held at the 12 Monkeys Music Hall and Pub. The new lineup includes hybrid tablets, notebooks, projectors, and its first-ever smartphone, called the Horizon. The smartphone has no official specs, yet, but it is expected to come out sometime in August this year. The event was also in chorus with the introduction of one of its newest brand ambassadors, music video director Willan Rivera.





## Ultimate Travel Companion



Fujifilm Philippines updated its world-renowned X-series digital camera lineup with the recent launch of the X-T10, dubbed as the ultimate travel companion because of its compact and lightweight body. The X-T10 is equipped with an APS-C X-Trans CMOS II sensor, combined with an EXR Processor II engine that produces outstanding image quality and high-speed performance. It also has a new AF system that offers a standard 49-point AF mode for high-speed precision focusing.



## A Great Spectacle

Enchanted by the town's rich culture, Nikon Philippines, joined by the Nikon Club, Nikon Pros, and a few members of the press, took a day off to go to Lucban, Quezon and capture a great spectacle of beauty and fruitage, highlighted by rows of colorfully decorated houses and streets filled with the town's offerings. The festival, known as Pahiyas, gave light and color to the Nikon Pahiyas Photowalk 2015.



## Bridging the Gap



With a desire to bridge the gap between online and traditional retailing, Zalora Philippines has opened its first-ever digital pop-up store in the country as part of its omnichannel approach. Looking like a typical outlet store, the Zalora Digital Pop-Up Store displays an extensive collection of clothing and accessories complete with mannequins and fitting rooms, offering new and existing customers the experience of traditional shopping and online shopping all in one venue.



## The New Flare

Cherry Mobile recently introduced the Flare X, a high-powered smartphone that carries 3GB of RAM, and is powered by a 1.7GHz octa-core processor. This new giant has components that make it a powerful device.

It flaunts hardware that is expected to impress: a 5.5-inch IPS Full HD screen with Corning Gorilla Glass 3 protection that guarantees optimal display quality, and a 13-megapixel Sony IMX214 rear sensor that allows shooting of high-grade images.



## Double the Shots



Announced earlier this year, the Canon EOS 5DS and 5DS R are now officially available in the Philippines. The two new DSLR cameras are complementary to the EOS 5D Mark III, exhibiting features that are even better suited for studio and landscape photography, thanks to a higher-resolution 50.6-megapixel image sensor and greater emphasis on fine details. Both are nearly identical, except the EOS 5DS R has optical low-pass filter (LPF) cancellation for sharper photos, while the 5DS uses the LPF to reduce moire effects.





# Click and Capture

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## Nikon School Goes on a Photo Safari Trip

# Nikon

Nikon Philippines, in partnership with 2Go Travel, kicked off its Nikon School On-Board through a Photo Safari Trip from Luneta in Manila to Calauit in Palawan.

The initial voyage was headed by award-winning photographer and one of the Nikon Pros, George Tapan. On the first night, he shared his journey in photography through pictures he took himself.

During the talk, he shared how he sailed to pro photography, mentioning that a great picture takes time and patience. Tapan believes that a perfect photo is at its most natural self, because he has this principle saying "photographs should look like what your eyes see."

Coming from Film Photography, it is only natural for Tapan to work slowly, as he meticulously constructs each detail from the composition of his photographs to the subjects he chooses. Since he controls everything that is going on his photographs, he makes sure that there is visible contrast

between the landscape and the subject, letting his audiences see how the two elements complement each other.

Greeted by several types of wildlife, from birds to Giraffes and Zebras at the Calauit Safari Park (a game reserve and wildlife sanctuary located in the island of Calauit in Palawan), the members of the Nikon School, with the knowledge from George Tapan, went out to capture the photos that will later land them with great rewards. The Photo Safari Trip taught the group how to capture awe-inspiring pictures, knowing that waiting for the "right moment" to trigger the shutter will render amazing results.

After two days of shooting, each participant was told to submit at least two entries for a chance to win a travel certificate sponsored by 2Go Travel, in partnership with Nikon Philippines and Epson Printing. The winning photographs will be displayed at the 2Go Travel corporate office and will be featured in the 2Go Travel ship.

For more exciting news and info, you can visit [www.nikon.ph](http://www.nikon.ph).

# For a Clean and Safe Environment

## Fuji Xerox Printer Channel Supports Brigada Eskwela

# FUJI xerox



Fuji Xerox Printer Channel (FXPC), as part of its CSR initiative, recently donated cash and in kind to Lodlod National High School's classroom-

preparation-and-cleaning program.

The endeavor is coordinated with the National Schools Maintenance Week, commonly known as Brigada Eskwela – a school maintenance effort aimed at providing the students a clean and safe learning environment.

The School officers, teachers, parents, and students of Lodlod National High School in Lipa, Batangas helped in preparing and cleaning the classrooms for the upcoming school opening.

Two representatives from Fuji Xerox Printer Channel presented the school with the donation: Allan Abunio, Sr., Sales Supervisor, and Glenn Icaro, Sales Assistant Manager. Diana Camacho, the Teacher-in-Charge for the school's Brigada Eskwela was in attendance to receive the donation.

To know more about FXPC's projects, you can visit its Facebook page at [www.facebook.com/FujiXeroxPrinterPhilippines](https://www.facebook.com/FujiXeroxPrinterPhilippines).



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# Meet the New Androids

## Arc Mobile Introduces New Line of Android TV Smartphones



Android TV functionality.

The Android TV family includes four new smartphones: the 353D, 403D, 503D, and 550D. While all four are dual-SIM and run on Android KitKat, they flaunt varying specifications.

The Android TV 550D is the most advanced of the four Arc Mobile smartphones. It has a 1.3GHz MediaTek MT6572 dual-core processor, 512MB of RAM, and 4GB of internal storage. It boasts a 5.5-inch IPS LCD display with a 960 x 540 resolution, and has an 8-megapixel rear and 2-megapixel front-facing camera.

The Android TV 503D is next in line with its 1.3GHz MediaTek MT6572 dual-core processor, 512MB of RAM, and 4GB of internal storage. It flaunts a

Arc Mobile, an emerging mobile brand in the country, plans to make an impression in the Philippine market with the introduction of its new family of smartphones with thrilling

4.92-inch TFT capacitive display with an 854 x 480 resolution, and it has an 8-megapixel rear and 2-megapixel front-facing camera.

Third is the Arc Mobile Android TV 403D. It is powered by a 1.3GHz MediaTek 6572 dual-core processor with 512MB of RAM and 4GB of internal storage. It sports a 4-inch TFT capacitive display with an 800 x 480 resolution, and is equipped with a 3.2-megapixel rear and 0.3-megapixel front-facing camera.

Last, but not the least, is the Android TV 353D. It works with a 1GHz MediaTek MT6572m dual-core processor, 256MB of RAM, and 2GB of internal storage. It is built with a 3.5-inch TFT capacitive display, and has a 3.2-megapixel rear and 0.3-megapixel front-facing camera.

With these four latest Arc Mobile offerings, you can now enjoy watching your favorite television shows anytime and anywhere. The handsets are available at very affordable prices, ranging from Php 1,799 to Php 3,499.

Be in the loop with the latest Arc Mobile news at [www.arcmobile.ph](http://www.arcmobile.ph).



# HIT THAT NOTE!



## MyPhone Ambassadors Enters Spotify with New Single 'Sabi-Sabi'



A new star to watch out for, 15-year-old MyPhone

ambassador, Kris Angelica, launched her first single "Sabi-Sabi" on Spotify, quickly creating a hype that trended on social media.

The rising teen artist started her singing career when she joined Eat Bulaga's Birit Baby in 2009, finishing first runner-up. She rose to stardom when a video of her performance of Gloc 9's Sirena during a MyPhone event in Tacloban gained more than a million online views in one day.

Kris Angelica already performed in major concert venues in the country, like Smart-Araneta Coliseum and MOA Arena, alongside local and international musicians. She is now doing several shows nationwide under Red Manila Inc. and VIVA Artists Agency.

"Sabi-Sabi" is written and composed by Thyro and Yumi, the songwriters behind hit songs "Dati" by Sam Concepcion, "Hanap-Hanap" by James Reid, "Para-Paraan" by Nadine Lustre, and Sarah Geronimo's "Ikot-Ikot" and "Kilometro."

For more information on Kris Angelica and her new single, you can visit her Facebook page at [www.facebook.com/iamKrisAngelica](http://www.facebook.com/iamKrisAngelica).

**ALLAN HAO CHIN,  
PRESIDENT,  
NORDE INTERNATIONAL DISTRIBUTORS**

**Please introduce us to 3D printing.**

3D printing is a fast-emerging technology that is revolutionizing how we design, develop, and manufacture things today. The technology is also known as additive manufacturing, and, in layman's terms, how it works is that a three-dimensional object is produced through the process of printing and bonding nano particles to create a desired shape. These nano particles can be made out of various substances such as plastic resins, metal, and even food. 3D printing is a technology that now allows people with ideas to innovate and create with almost limitless possibilities. It aids ordinary individuals and industry specialists across varying fields to push the boundaries of arts and sciences with its ability to create physical objects that traditional manufacturing methods cannot achieve.

**What are its advantages in various industries?**

3D printing technology is a great contributor to many fields and industries. In education, for instance, it allows students with creative minds, the future engineers, and tomorrow's problem solvers to experience practical applications of theories by enabling them to build prototypes of their ideas. In aerospace, the engineers of NASA used 3D printing to build many special and unique parts of the space rover that support their exploration in outer space. Even mainstream global companies such as Samsung, Microsoft, Apple, and others are now using 3D printing for R&D purposes and test marketing more and more today.

**3D printing can be very expensive. What have you done to convince industries to consider investing in this futuristic technology?**

In terms of industrial applications, 3D printing is not yet for everyone at this point in time. But, in certain industries, the benefits can be tremendous. What we have done was focus our initial efforts on these particular segments by exhibiting in relevant trade shows and giving seminars in related trade organization events. Awareness is the first step. Once we have identified companies or organizations that will benefit from 3D printing, we then go through a rigorous process of engagement that involves ROI analysis, presentation of case studies, benchmarking, and test printing to clearly show the value that the technology will bring to them. Also, "expensive" is a relative term. If we are able to prove that for each day that an organization holds back from investing in a 3D printer, they end up spending more in development costs or end up losing sales because of slow time-to-market, and not buying a 3D printer will come out to be the a more expensive option for them.

**Norde states that 3D printing opens up possibilities. Can you see it as a booming process in 2015 and in the coming years?**

The Philippines has been experiencing one of the fastest economic growths in Asia these past few years, and part of the reason is the influx of investments in the manufacturing segment. If this continues, we can expect 3D printing's growth to follow, as manufacturing is one area where the technology brings huge benefits in terms of cost and time savings.

**As the President of Norde, how do you plan to make the company and its offerings even more pronounced in the Philippines?**

Aside from the usual marketing activities that we do, I believe that one of the most powerful ways to promote oneself is still through good word-of-mouth. We need to make sure that our customers and their end customers are successful, and everything else will follow. Norde is investing tremendously in our infrastructure and our people in our goal to provide a partnership with customers that goes beyond just selling a piece of equipment.





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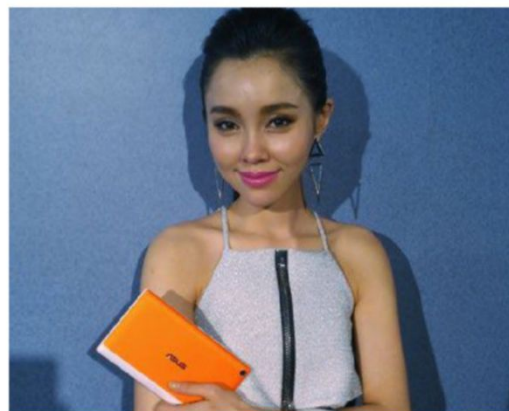
# ASUS SHINES AT COMPUTEX



**ASUS**®HWM got a taste of what's to come from the home of ASUS in Taipei, Taiwan during Computex 2015. They're nothing short of spectacular!

## THE HEADLINERS

Before Computex officially kicked off, ASUS Chairman Jonney Shih took the stage during the company's Zensation event to introduce the Zen AiO, ZenFone Selfie, ZenPad, ZenWatch 2, and PA329Q 4K ProArt Calibration Monitor – all of which were available for a quick hands-on after the announcement.



The ZenPad is set to reimagine the category of tablets, according to ASUS. It'll come in two 8-inch models: ZenPad 8.0 and ZenPad S 8.0.



The Zen AiO was one of the more impressive products of the show with its high-end specs and aluminum unibody.



The ZenFone Selfie has front and rear 13-megapixel PixelMaster cameras with dual-color, dual-LED Real Tone flash.



The 32-inch 4K PA329Q is designed with wide color gamma reproduction, having a 100% Adobe RGB color space coverage.



Not much was revealed about the ZenWatch 2, but we can tell that the body was redesigned and looks sleeker.

## LET'S NOT FORGET THESE BEASTS!

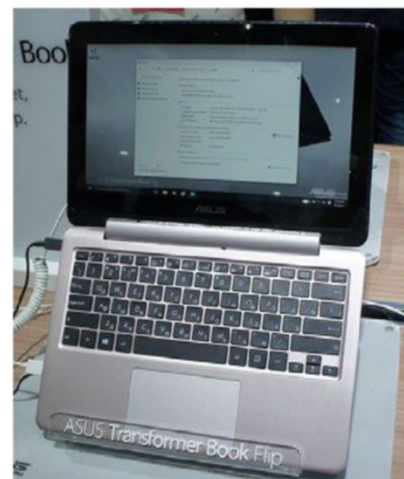
Not to be outdone, these products were shown off during Computex. They all represent the latest technologies to come out of ASUS' labs. To get the latest news on all these products, visit [www.hardwarezone.com.ph](http://www.hardwarezone.com.ph) and [www.asus.com.ph](http://www.asus.com.ph).



ASUS LX341 Curved 21:9 Monitor



ASUS Transformer Book T100HA



ASUS Transformer Book Flip TP200



ASUS ROG Curved G-Sync Monitor



ASUS ROG Swift PG279Q



ASUS Strix GeForce GTX 980 Ti OC



# AMD CARRIZO APU UNLEASHES POWER AND PERFORMANCE



**AMD** At Computex 2015, the newly launched AMD Carrizo APU has seen some action via showcase from various partners such as Acer, Dell, HP, Lenovo, Toshiba, and more.



AMD continues to push and redefine the mainstream computing segment to offer a far better experience than what the competition offers. However, the lack of visibility and availability of retail products using AMD's core computing platform is a concern that the brand needs to address. The launch of the AMD Carrizo APU is a step to focus on this.

Optimized for mobility products, the AMD Carrizo APU arrives as one of the world's most versatile notebook processors. It packs a more efficient "Excavator" processing core, an updated graphics core that supports AMD's third-generation GCN architecture (which is the latest iteration used in the AMD R9 285 "Tonga" GPU and newer products), and new multimedia hardware through a hardware-assisted HEVC/H.265 decoding engine, plus it's way more energy efficient than its predecessor.

Right after the official launch of the AMD Carrizo APU, a number of devices from close partners were showcased. What's encouraging is that almost all of them are from tier-one vendors that have good visibility, presence, and branding.

Three models will be made available for the notebook segment, and these are the FX-8800P, A10-8700P, and A8-8600P.

Expect to see these new AMD-powered systems in retail beginning the end of June in selected regions. Global availability is expected within two months after that.



## Freesync, VSR, AND DIRECTX 12 SUPPORT COME TO GODAVARI AND KAVERI

Along with the timely launch of the Godavari APU, a new driver released by AMD on that day also brings about new software feature support for both the Godavari and Kaveri APU. These APUs now have support for AMD's FreeSync technology, Virtual Screen Resolution (VSR), and full DirectX 12 support.

This marks a new era that opens up the flexible and versatile future of the gaming industry, and Godavari's APU is helping to enable one aspect of it.



## GODAVARI FOR DESKTOP

Although Carrizo is the star of AMD's Tech Day 2015 in Computex, they also provided an update regarding their developments on desktop computing. The Godavari APU was unveiled, and it will gradually replace the existing Kaveri desktop APU.

Unlike most new codenamed products that bring something brand-new to the market, Godavari is more like an updated edition of the same Kaveri APU. If you were to peer underneath, architecturally, it's essentially using the same building blocks and silicon as the original Kaveri.

However, even if there are no brand-new architectural or hardware features, the plus point is that AMD has managed to improve gaming and productivity performance of an already well-oiled product, which works on a wide variety of Socket FM2+ motherboards that are available in the market.

The new APU has a comfortable suggested retail price of US\$ 137. Channel availability starts on May 28, and OEM availability is on June 2.



# THE BIGGER, THE BETTER

LG 105UC9

[www.lg.com/ph](http://www.lg.com/ph)



Boasting an immense resolution of 5120 x 2160 pixels, the LG 105UC9 offers an extraordinary viewing experience. It features a list of functionalities that is nothing short of wonderful. It has Smart TV functionality, utilizing LG's webOS and Magic Remote, and it has Wi-Fi connectivity, a host of input options that include an HDMI, USB 3.0, and LAN, and conversion options between 2D and 3D. This 105-inch Curved Super Ultra HD TV also uses Harman Kardon's 7.2-channel, 150-watt speakers, making your viewing experience even more immersive.



# World's First and World's Largest 105-inch Curved Super UHD TV

## Unparalleled size comes with unmatched picture quality

Globally revealed at the Consumer Electronics Show (CES) in Las Vegas early this year, this spectacular new model 105UC9 boasts of a resolution of over 11 million pixels (5120 x 2160)—five times more than on a Full HD TV—and CinemaScope 21:9 aspect ratio. These elements deliver a truly immersive viewing experience with ultra-sharp, lifelike images all over the 105-inch screen and stunning virtual surround sound.

The superior picture quality of the 105UC9 is complemented by LG's True 5K Engine Pro and IPS 5K Panel. The former eliminates visual errors and can upscale lower-resolution content into near-ULTRA HD quality, while the latter provides consistent contrast, true-to-life colors and a wide viewing angle.

## Superiority comes in full circle with impressive audio

Sound quality is certainly not compromised as the 105UC9 sports a built-in 7.2-channel, 150W sound system, ensuring a powerful and rich audio experience. It also incorporated LG's ULTRA Surround concept developed in partnership with audio manufacturing leader Harman Kardon. The multi-channel system harmonizes with the TV's 21:9 CinemaScope screen with a sonic performance worthy of an actual movie theatre.

## Enhanced by the highly immersive curve and 3D technology

With the same aspect ratio as a Hollywood motion picture, the 105UC9 CinemaScope 21:9 screen recreates the movie experience in the home. The curvature of the display has been carefully calibrated to maximize the immersive ambiance. And by combining Film Patterned Retarder (FPR) 3D technology with extremely high picture resolution, LG's 5K 3D+ feature offers unobtrusive and compelling 3D viewing pleasure. Thanks to the 5K 3D Upscaler, content in SD, HD and Full HD is converted into crystal-clear, near-ULTRA HD resolution.



**LG SUPER UHD TV**

"We are thrilled to bring to the Philippines the newest and most spectacular innovation of LG, the 105-inch CURVED Super ULTRA HD TV," LG Philippines Home Entertainment Vice President Hoony Bae said. "Last December, we launched the country's largest 98-inch ULTRA HD TV. This summer, we take it a notch higher and reinforce that it's all possible when you bring today's most advanced TV technologies together. The vision behind the 105UC9 was to bring the movie theatre into the living room, providing the optimal home entertainment experience for our consumers."

## User experience in the highest level of intuitive

The 105UC9 promises a greatly satisfying user experience via LG Smart+ TV, which is centered on the intuitive webOS platform. LG's webOS makes everything simple and fast, whether it's switching between content; discovering exciting new shows, apps and services or connecting to media stored on external devices. And with the help of the endearing, animated BeanBird character, webOS also makes the initial setup and connection process quicker and much more enjoyable.

To learn more about the one-of-a-kind LG 105-inch Curved Super ULTRA HD TV, visit [www.lg.com/ph](http://www.lg.com/ph), like LG's official Facebook page "LG Philippines" or follow @LG Philippines on Twitter and Instagram.



# YOUR ON-THE-GO CAMERA

## Fujifilm X-T10

[www.fujifilm.com.ph](http://www.fujifilm.com.ph)

Featuring an APS-C X-Trans CMOS II sensor with built-in phase detection autofocus, the Fujifilm X-T10 offers intermediate-level photographers and enthusiasts 16-megapixel outputs with ISO levels that reach 51200 when expanded. The X-T10 has a 3-inch tilting LCD that lets you take images from close to the ground or overhead with ease, and there's also an OLED electronic viewfinder for more accurate framing and compositions. It also lets you shoot Full HD video at up to 60fps, and it has a continuous shooting speed of up to 8.0fps.



# THREE TIMES THE POWER

## Cheero Power Banks

[www.cheero.net](http://www.cheero.net)

Charge conveniently with this set of Cheero power banks! If you want something stylish, you can go with the Handy 6000mAh. It is only 0.4 inches thick, made with leather-like material, and has a built-in USB charging cable that lets you easily charge your devices and relieves you from tangled cables. If you want something smaller, you can choose the Cheero Power Plus Danboard Block and Plate power banks, designed like lovely cardboards. The Block 3000mAh is the ultra-compact and lightweight one, while the Plate 4200mAh is the thinner one that easily fits in your purse or pocket.



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# STRONG SOUNDS

## Philips A5-PRO

[www.philips.com.ph](http://www.philips.com.ph)

Boasting a tough yet lightweight aluminum construction with 50mm drivers, the Philips A5-PRO lets you enjoy listening to clear sounds even at high volumes in any active DJ environment. This pair of professional DJ headphones has detachable ear cushions that isolate sound so you can listen to music with absolutely no distraction from the outside world. Alternatively, you can easily pay attention to outside sounds if you want with its 90-degree swivel ear shells. It also folds into a compact form, so you can effortlessly carry it around wherever you go.



# ONE VERSATILE SPEAKER

Philips BT6000B

[www.philips.com.ph](http://www.philips.com.ph)

With the Philips BT6000B wireless portable speaker, you can listen to music any way you like. It has front and back 1.5-inch Neodymium speaker drivers that generate 360-degree sound, so you can face your speaker vertically or horizontally, and still be able to hear clear and even sound. You can use it outdoors with its splashproof and rugged design, and it has a built-in microphone that you can use for hands-free phone calls. It has Bluetooth and NFC functionalities so you can easily pair it with your device and stream music wirelessly wherever you go.



**TDK WR680**  
// PhP 3,300



With its Bluetooth and NFC capabilities, pairing your smartphone and other devices is easier on the TDK WR680 on-ear wireless headphones. The in-line microphone and smartphone controls also allow you to take calls and manage your music better. [www.tdkperformance.com](http://www.tdkperformance.com)



**CORSAIR RM850i**  
// US\$ 199.99



With its all-Japanese 105-degree Celsius capacitor, the Corsair RM850i lets you have a reliable power supply for your high-performance PC. It is 80 PLUS Gold-certified, giving you extremely tight voltage regulation, silent operation, and a totally flexible cable set. [www.corsair.com](http://www.corsair.com)



**CD-R KING WIFI SMART POWER PLUG**  
// PhP 1,280

Easily turn your appliances on or off at home with the use of your smartphone and the new CD-R King WiFi Smart Power Plug. This smart plug comes with a QR code that you can pair with your smartphone, letting you schedule and control your power usage. [www.cdrking.com](http://www.cdrking.com)



**PHILIPS FL3X**  
// PhP 2,849



Compact enough to fit in your pocket, the Philips FL3X wireless portable speaker lets you carry your music wherever you go. It has a built-in rechargeable battery with 12 hours of playtime, so you can pump up all the bass you need. You can also expand it to produce more bass. [www.philips.com.ph](http://www.philips.com.ph)

**GADGET  
BRIEF**



**EUROO ASPIRER BACKPACK**

Available in dark gray, light gray, and blue, this Limited Edition Aspirer Backpack from Euroo looks and feels good. Made with Australian felt fabric, it's damp-proof and shockproof, with anti-scratch, heat-insulation, and sound-insulation protection.



**EUROO ACHIEVER BACKPACK**

Made with Terylene fabric, and available in blue, army green, and gray, the Achiever Backpack from Euroo offers you a light and crease-resistant storage. It has a 15.6-inch integrated compartment with a front storage that will keep your things in place.



**EUROO ACHIEVER 2-IN-1 BACKPACK**

If you need a backpack or carry-on bag, the Euroo Achiever 2-in-1 Backpack will bring it to you. With its integrated 15.6-inch compartment with slots for your business cards and important devices, organizing your stuff has been made a lot easier.

[www.euroo.net](http://www.euroo.net)



## SANDISK IXPAND FLASH DRIVE

// From PhP 3,800

The iXpand Flash Drive is SanDisk's solution for iOS users. It enables easy transfer of files from an iPhone or iPad to a Mac or PC, sans wires and Internet connections. It enables cross-platform encryption and secures files with the use of the iXpand sync app. [www.sandisk.com](http://www.sandisk.com)



## ALCATEL ONETOUCH FLASH PLUS

// PhP 6,490

Powered by a 1.5GHz MediaTek MT6752M octa-core processor with 2GB of RAM, the Flash Plus lets you run games and applications without lags. It sports a 13-megapixel rear camera, an 8-megapixel front camera, and a 3500mAh non-removable battery. [www.alcatelonetouch.com/ph](http://www.alcatelonetouch.com/ph)



## URBAN ARMOR GEAR SCOUT

Called the Scout, this tough-looking black armor shell from Urban Armor Gear will make your Samsung Galaxy Note 4 look rugged.



## URBAN ARMOR GEAR OUTLAND

With this bright, feather-light armor shell from UAG, know that your precious iPhone 6 Plus is protected from harmful elements.



## URBAN ARMOR GEAR MAVERICK

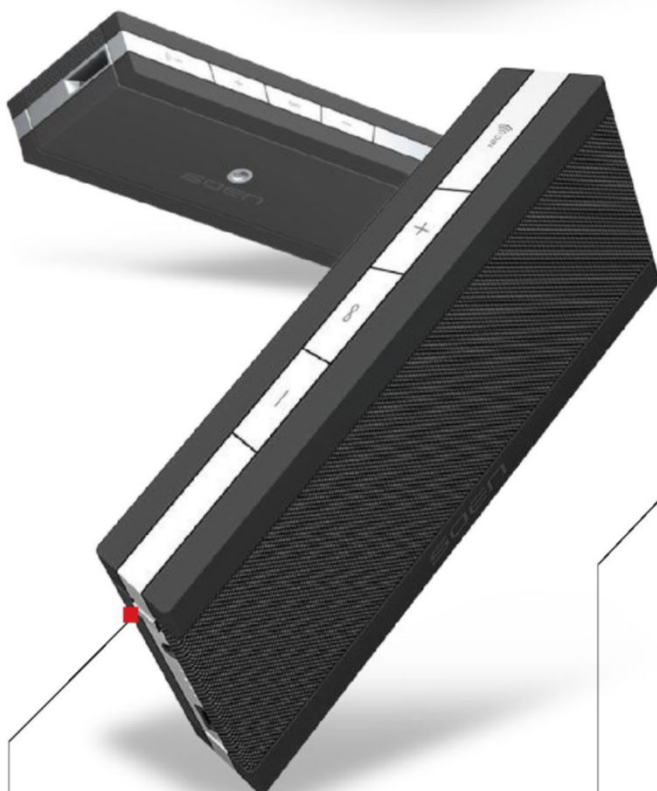
Guard your iPhone 6 against unwanted scratches with this Maverick case from UAG that has an HD screen protector.



## URBAN ARMOR GEAR SCOUT FOLIO

With this UAG case that meets military drop-test standards, you know your iPad mini is always protected wherever you go.

[www.urbanarmorgear.com](http://www.urbanarmorgear.com)



## SOEN TRANSIT XS

// PhP 5,990

Enjoy music anywhere with the Soen Transit XS portable wireless speaker. With its rubber grips, you can be sure that it can take a tumble and still hold up without a scratch. It uses Precise Talk technology so your music is clearer, stronger, and simply more outstanding. [www.soenaudio.com](http://www.soenaudio.com)



## AUDIO-TECHNICA ATH-CKX9IS SONICFUEL

// US\$ 99.95

Flaunting a C-tip design that snugly fits ears, the Audio-Technica ATH-CKX9IS SonicFuel earphones offer comfort with style. It stays in your ears so you can enjoy living an active life while you listen to music and immerse yourself in an outstanding audio experience. [www.audio-technica.com](http://www.audio-technica.com)



# LAB RESULTS

Every month, behind the doors of our super secret gadget testing facility, the latest tech products are put through their paces using industry-recognized benchmarks and our own blend of real-world usage scenarios. Here are our findings.



## THE AWARDS



10



9/9.5



8/8.5



Best Performance



Best Value

Review scores of 8/8.5 are awarded the Silver Award. 9/9.5 get the Gold. ONLY a perfect 10 wins our Platinum Award.



For more comprehensive takes on the features and performance of the products reviewed here, visit [HardwareZone.com.ph](http://HardwareZone.com.ph).



# ASUS Transformer Book T300 Chi

## TRANSFORMING AHEAD

We first saw the ASUS Transformer Book T300 Chi hybrid 2-in-1 notebook at Computex in June last year, and we were astounded by its amazingly thin design. To be exact, the tablet display measures just 7.6mm thick and weighs only slightly above 700g, meaning it's not much thicker than an iPhone. Its light weight does not mean ASUS has scrimped on specifications, though. The display measures 12.5 inches diagonally and outputs a resolution of 2560 x 1440 pixels, giving it a pixel density count of just under 235 pixels per inch, which is comparable to the Retina display found on Apple's MacBook Pro.

ASUS has placed an increased emphasis on design in recent years, and the Transformer Book T300 Chi features an all-aluminum construction that feels strong despite its thinness, and does not exhibit any signs of flexing. Because the Transformer Book T300 Chi is so thin, ASUS could not

afford to outfit it with standard full-size USB and HDMI ports. Instead, the device has a more compact micro-USB port and micro-HDMI port. It also comes with a detachable keyboard dock, which attaches to the tablet display via a magnetic hinge.

The Transformer Book T300 Chi is so thin, mainly because it is powered by one of Intel's new Core M processors. They are designed specifically for use in ultra-thin notebooks and hybrid devices. It has a TDP of just 4.5W so it requires no active cooling. What powers the Transformer Book T300 Chi is the top-of-the-line Core M-5Y71, a dual-core part that has a base clock of 1.2GHz and a maximum turbo clock speed of 2.9GHz.

The 2-in-1 hybrid notebook has a tested battery life of about four hours. Now, the concept of hybrid devices is not new, but few can properly execute it. To date, among the many hybrid devices we have reviewed, the Lenovo Yoga 3 Pro and Microsoft

Surface Pro 3 are the ones that best embody this idea, combining the best aspects of a tablet and an ultraportable notebook. The ASUS Transformer Book T300 Chi can now count itself in this list.

Unfortunately, performance is not one of the Intel Core M's strong suits. In our tests, we found that it would trail an Intel Core i5 system by around 15 to 30 percent. It is by no means underpowered for its category and not a fault of ASUS, but anyone looking at one of these super-sleek new Core M machines will have to get used to lower performance than a Core i5.

All things considered, the ASUS Transformer Book T300 Chi is one of the best implementations of Intel's Core M processors we have seen yet. At a price that starts at Php 39,995, it appears to be decently priced for its design, build quality, features, and performance.

by *Kenny Yeo*

### AT A GLANCE

#### Processor

Intel Core M-5Y71  
(1.2GHz, 4MB L3 cache)

#### Memory

8GB LPDDR3 RAM

#### Graphics

Intel HD Graphics 5300

#### Storage

128GB SSD

#### Price

From Php 39,995



The Transformer Book T300 Chi's keyboard adds considerable heft, but is a joy to use for typing.

### CONCLUSION

**The ASUS Transformer Book T300 Chi appears to be decently priced, and it is one of the best implementations of Intel's new Core M processor we have seen yet.**

TAP FOR  
WEBSITE



SILVER  
**HWM**  
PHILIPPINES

TESTED & RATED

**8.5**<sub>/10</sub>

**HWM**  
PHILIPPINES



## AT A GLANCE

**OS**

Android 5.0 Lollipop

**Display**5-inch Super LCD 3  
(1920 x 1080, 441ppi)**Processor**Qualcomm Snapdragon  
810 (Octa-core)**Storage**32GB, expandable up to  
128GB via microSD**Price**

US\$ 650



The M9 has revamped BoomSound dual stereo speakers, resulting in the best smartphone audio around.

## CONCLUSION

**The HTC One M9 looks gorgeous, but we expected more from it. This smartphone leaves a very big question hanging over HTC's head and even our own's: Where does it go from here?**

TESTED &amp; RATED

**8.0**<sub>/10</sub>**HWM**  
PHILIPPINES

# HTC One M9

## ANOTHER GORGEOUS DEVICE

HTC's latest flagship smartphone, the HTC One M9, seems to be following the rule, "If it ain't broken, don't fix it." The One M9 shares an almost identical design as its predecessor (and even its predecessor's predecessor), with just a few minor tweaks to differentiate it from last year's model.

Most noticeably, the new M9 has a two-tone design. It has a new gold-silver finish, which is gold on the edge and brushed silver on the back. HTC has also finally relocated the power button from the top edge to the right-hand side, below the volume buttons, and it is more ergonomically friendly now. All the buttons on the M9 are now metal, and the power button even has a light circular etching on it.

The rest of the HTC One M9 is almost exactly the same as the One M8, with a gently curved all-metal body, and inset plastic antenna lines. The M9

has a 5-inch display with a Full HD resolution (441ppi), which is the exact same size and pixel count as its predecessor. Text looks sharp and crisp, and the Super LCD3 display provides decent contrast and color reproduction, too.

Audio has always been HTC's trump card, and once again, the One M9's front-facing BoomSound stereo speakers deliver. This year's BoomSound speakers get a Dolby surround treatment, and the result is rich, deep, and loud audio. The small speakers have surprisingly good depth, and lots of midrange detail, although as you might expect, the low-end is a little lacking.

Camera-wise, HTC has ditched its gimmicky UltraPixel and Duo Camera technology, opting instead for a regular 20.7-megapixel f/2.2 rear camera (UltraPixel isn't actually entirely gone, you'll find it on the front 4-megapixel camera). Image quality on the M9 was fairly good,

and sharp throughout the image, although noise control was a bit too aggressive for our liking.

The One M9 runs on Android 5.0 Lollipop with HTC's Sense 7.0 UI on top of it. One new feature is Sense Home, which displays eight apps (or app folders) on your homescreen depending on your location. The M9 is powered by a Qualcomm Snapdragon 810 64-bit octa-core processor with 3GB RAM. Performance-wise, it scored well on our benchmark tests, but wasn't quite as good as Samsung's Galaxy S6. Battery life was a little disappointing, though, lasting just short of eight hours.

Two years ago, HTC was breaking new ground and leading the way for Android phones with the all-metal HTC One M7, but now its competitors have caught up. There's not much new or exciting about the One M9, and while it's still a great phone on its own merits, we expected more from HTC.

by James Lu



# ASUS ZenFone 2

## 4GB OF RAM ON A SMARTPHONE!

The rise of the ZenFone series has been one of the more pleasant surprises of recent memory. The smartphones released last year brought ASUS' mobile division to greater prominence, and the Taiwan-based company wants to build on that. The ZenFone 2 and all its variants obviously have a lot to live up to.

The handset seems hefty on paper, but when you get your hands on it, it's actually quite light. The way the body tapers towards the edges makes the ZenFone 2 feel thinner than what you'd expect from a 10.9mm-thick frame. The rear cover can be removed to reveal the micro-SIM and microSD slots, but for some reason, the battery is non-removable.

The ZenUI skin ASUS plastered on this version of Android Lollipop is a mix of old and new. The notifications, settings, and overall color palette follow Google's Material Design, while the default icons,

app drawer, and lock screen remind us of the classic ZenUI look. The 5.5-inch display with its Full HD resolution is bright and sharp enough compared to similar-sized screens, and both gaming and watching movies on it was a blast.

Without a doubt, just by looking at the specs, it's clear that we have a fine performer in actual usage. The processor may not be as popular as the ones you see from MediaTek or Qualcomm, but it has advantages in certain functions, such as multitasking and heat management. This was certainly the case during our long outing with the ZenFone 2, though we also have to give a ton of credit to the 4GB of RAM. Benchmark scores were excellent, beating last year's flagships by a large margin and keeping up with this year's best, especially in the gaming department.

The smoothness of the interface extends to the camera, which is one of the fastest we've

ever used, including those of other flagship smartphones. The startup is quick and focusing is near instant even in challenging environments, and its f/2 aperture helps keep the shutter speed fast enough for moving subjects. Sharpness was more than acceptable under artificial indoor lighting, while color reproduction was generally accurate. There's also a host of manual settings to tinker with to get exactly what you want.

One gripe we have with the ZenFone 2 is its underwhelming battery life; it's difficult to get through a day even with the power-saving options. Luckily, ASUS' BoostMaster technology can charge the phone from zero to 60 percent within 40 minutes.

There's so much to like about the ZenFone 2, especially at its price point. Looking through all the variants can be confusing, but we highly recommend the one we reviewed here.

by Marvin R. Velasco

### AT A GLANCE

#### OS

Android 5.0 Lollipop

#### Display

5.5-inch IPS LCD  
(1920 x 1080)

#### Processor

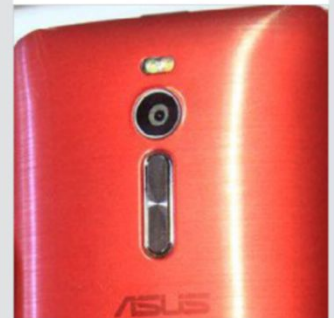
Intel Atom Z3580  
(Quad-core, 2.3GHz)

#### RAM

4GB

#### Price

Php 13,995



The volume keys are conveniently placed at the back, but the power button commands a bit of a reach.

### CONCLUSION

**With four variants to choose from in the local market, the ZenFone 2 has something for everybody. Overall performance is fantastic, especially for its asking price.**



TESTED & RATED

**8.5**<sub>/10</sub>

**HWM**  
PHILIPPINES



## AT A GLANCE

**OS**

Android 5.0 Lollipop

**Display**5.5-inch IPS LCD  
(1280 x 720)**Processor**MediaTek MT6752m  
(Octa-core, 1.5GHz)**RAM**

2GB

**Price**

Php 7,390



The A7000 has a lone speaker at the back, which produces all the sound that comes out from the device.

# Lenovo A7000

## STOP, LOOK, AND LISTEN!

Lenovo has been known to use Dolby Audio in its line of PCs and tablets. Last May, the company locally launched the first-ever smartphone that uses Dolby Atmos sound technology. With audio quality playing a crucial role when playing music, videos, and even games, it appears to be only fitting that Lenovo has given birth to a smartphone that will let users enjoy superior audio quality in a compact form.

With the Lenovo A7000, you won't need to power up your PC or television at home or at work to immerse yourself in an extraordinary audio experience. Anywhere you go, the A7000 will let you have a better grasp of what you are listening to.

In terms of aesthetics, we found nothing revolutionary on the review unit we had. It has the power button and volume rocker on one side, a micro-USB port and 3.5mm headphone jack on top, and a speaker and camera with flash on the back.

If you want style, you won't find it on the A7000. Its weight, at 140g, has just enough heft. It's good, though, as you won't feel weighed down when you carry it around with you.

The Lenovo A7000 has a 5.5-inch IPS LCD display – a good combination for its Dolby Atmos – that makes watching high-definition movies even more immersive. It sports an 8-megapixel rear camera, which produces slightly dull, but good enough pictures. Its 5-megapixel front camera, similar to other Lenovo phones we reviewed before, is capable of producing great selfies. We recommend it to those who want blemish-free selfies – no pimples, dark lines, and all unwanted marks.

With a few HD movies we have, we tested the A7000's capacity to produce stunning sound. At first, without comparison, we found the sound to lack the Dolby Atmos hype. Running it side by side with a smartphone without Dolby

Atmos technology and at almost the same price point, though, gave us the difference we were looking for. The sound produced by the A7000 was definitely clearer, stronger, and more balanced. It easily overpowered the other smartphone by about 70 to 80 percent, which is quite impressive.

The A7000 is powered by a 1.5GHz MediaTek MT6752m octa-core processor with 2GB of RAM and 8GB of internal storage. Throughout our use, we found the A7000 to be capable of running several applications at the same time without lags. The battery capacity is also good, as we were able to run our tests in one single charge.

Overall, we think the Lenovo A7000 is a great find. It may lack great style, but it looks tough. Paired with the right accessories, this smartphone can definitely offer you an impressive listening experience.

by Ashley Lucas

## CONCLUSION

**The Lenovo A7000 produces clear, strong, and balanced sound. Paired with the right accessories, it can definitely offer you an impressive listening experience.**

TESTED &amp; RATED

# 8.5<sub>/10</sub>

**HWM**  
PHILIPPINES



# Happy Mobile Aspire

## A HAPPY PURCHASE

Local brands are embracing the birth of octa-core smartphones, which was proven after continual releases starting early 2014. Happy Mobile, being quite a new brand in the local smartphone scene, still has a lot to prove. The good news is that it appears to have fared well with consumers with the release of its first octa-core smartphone, the Happy Mobile Aspire.

The Aspire is bundled with a Quick View flip cover with a hole on the front, which when closed, lets the 5.5-inch HD OGS screen automatically display an analog clock. We find it quite amusing, as even when the screen is locked and the flip cover is opened, the display automatically comes back to life without having to press the power button.

Once the flip cover is removed, you'll find a smartphone that feels premium. It has an aluminum frame that makes it look tough, but what we don't approve of is the protruding camera on the rear of the device.

It is aligned with the back cover and actually has no protection other than when the front cover is folded to the back, so even though our review unit has the flip cover, the possibility of the camera accumulating scratches has been pretty obvious.

Despite this little hiccup, though, we still find the cameras of the Aspire to be of noble standing. We all know that lighting plays an important role when capturing images. With the sun glowing mighty and high, we managed to get stunning outdoor shots using its 13-megapixel rear camera. We took it outside on a gloomy day, and we got pretty decent results, as well. When used indoors, the images tended to be a bit grainy, but still acceptable. The flash didn't make that much difference, though, and when we tried using it a distance away from a glowing computer screen, all we got were images clouded with bright light. We don't have gripes with its 8-megapixel front camera,

as it appears satisfying enough for taking selfies or groupies.

With a 1.7GHz MediaTek MT6592 octa-core processor, plus 2GB of RAM and 8GB of internal storage, the Happy Mobile Aspire was able to run applications smoothly. We do hope that the Aspire gets upgraded to the latest Android operating system, however, as the review unit we had still runs on Android KitKat.

In terms of battery performance, we feel that its battery with 3200mAh capacity had done its job well. The handset features an ambient light sensor, which we think has definitely helped lower the smartphone's power consumption.

For an octa-core device, we believe that the Aspire has managed to perform for what it's worth. There may be hiccups, but we still commend this device for its notable functionalities and good performance.

by Ashley Lucas

### AT A GLANCE

#### OS

Android 4.4 KitKat

#### Display

5.5-inch OGS LCD  
(1280 x 720)

#### Processor

MediaTek MT6592  
(Octa-core, 1.7GHz)

#### RAM

2GB

#### Price

Php 6,999



It comes with a flip cover that, when closed, lets the screen automatically display an analog clock.

### CONCLUSION

**The Happy Mobile Aspire has managed to perform decently well for what it's worth, and we still commend it despite the few hiccups we encountered along the way.**



TESTED & RATED

**8.0**<sub>/10</sub>

**HWM**  
PHILIPPINES



## AT A GLANCE

**Frequency Response**

75Hz - 20kHz

**Impedance**

4 ohms

**Connectivity**

Bluetooth 3.0, 3.5mm AUX, micro-USB port, and USB port

**Battery**

6000mAh

**Price**

PhP 7,995



On one side of the Charge 2 is a micro-USB port, 3.5mm AUX, and USB port for charging your device.

## CONCLUSION

**The JBL Charge 2 can sure give you some great bass, and if you want the added bonus of a battery pack, this portable Bluetooth speaker can definitely satisfy your needs.**

TESTED &amp; RATED

8.5<sub>/10</sub>HWM  
PHILIPPINES

# JBL Charge 2

## POWER UP THAT BASS

In the past years, the constant downpour of Bluetooth speakers has been obvious.

They come in different shapes and sizes at various price points, which, we won't deny, can be somewhat confusing, especially when someone is trying to decide what to actually buy.

As soon we set our eyes on the JBL Charge 2, we knew that something adorable had been laid on our table. We've probably had enough of bulky speakers that portable Bluetooth speakers can easily look as charming as our cute next-door neighbor. That is our defense in this case, anyway.

The Charge 2 looks tough on the outside, like it doesn't have a problem taking a tumble. It doesn't come off too strong, though, as it has a rubberized exterior, which may have given it that tough yet laidback look. On top of the speaker is the control panel, wherein you can find its backlit controls that include the power button, Bluetooth

switch, volume rocker, Social Mode button, and call button. It also has a built-in microphone, a platform at the bottom that holds it in place, and passive radiators with the JBL logos on both ends.

Pairing the Charge 2 with our devices was easy. Using its Social Mode, we tried pairing it with three devices at the same time. Fortunately, we didn't encounter any trouble with it. When we pressed play, we were greeted by an evidently rich bass. We tried playing different tracks, firing it up at full volume, and then diminishing the volume by half. There were some tracks on our playlist that seemed to have sounded slightly distorted at middle and full volumes.

Overall, though, we were satisfied with what we were hearing, as the sound quality of the majority of the tracks we played on it was still great.

Apart from the rich bass it produces, the Charge 2 should be noted for its ability to charge devices. With an ample battery

capacity of 6000mAh, there is no doubt that it still has extra juice to power up other devices. The manual says that the Charge 2 can last up to 12 hours of playback time. In our test, on the other hand, the Charge 2 didn't last exactly 12 hours; it managed to have a little more than 10 hours of continuous playback time at full volume.

We also tried playing music at low to mid volumes while charging a smartphone for two hours straight. When we checked the power indicator, we learned that we only lost one out of the five lights, which, based on our calculation, means the Charge 2 can play music at low to mid volumes and charge another device for at least 10 hours.

If you want to hear some great bass, and would like the added bonus of a built-in battery pack, then the JBL Charge 2 is definitely the portable speaker for you.

by Ashley Lucas



# Sony Walkman NWZ-A15

## FOREVER ICONIC

With smartphones replacing practically every gadget in our arsenals (from cameras to handheld gaming consoles), dedicated devices are slowly finding their way out the door. This isn't the case for the Walkman series, however, with the iconic brand still churning out music players that prioritize audio quality over all-in-one functionality. What we have here is the Walkman NWZ-A15, and it packs a lot more punch than what you can tell from its design.

So, what exactly is the Walkman NWZ-A15? For starters, it's Sony's lightest and most affordable High-Resolution Audio (HRA) Walkman to date. This means it can play lossless audio files without drilling a hole through your wallet. While HRA is still finding traction in the mainstream market, Sony is looking to solidify its grasp on the low-end segment with this affordable music player.

We won't blame you if the physique looks like it comes

from the year 2005. The 2.2-inch display is of the TFT LCD variety with a low QVGA resolution and no touchscreen to speak of. Instead, all functions are handled by the diamond-shaped controls at the bottom, as well as the Back and Option buttons right below the screen. On the sides, we have a Hold switch to lock the controls, a volume rocker, microSD slot (with accompanying flap), 3.5mm audio port, and a proprietary port for data transfer and charging via USB.

The interface itself is basic enough to figure out on your first go, but getting around is generally cumbersome. It's not that we're against non-touchscreen interfaces, but the directional pad and other inputs make going through menus a chore at times. The upside is that you don't have to look at the device when skipping tracks or adjusting the volume, which is useful while jogging. The other plus is the battery life you get out of the NWZ-A15, which can easily

last over a week with daily usage (although this is really dependent on the quality of the tracks).

Hooking up headphones or speakers can be done seamlessly through a wired connection or Bluetooth (together with the convenience of NFC). Once connected, the world of HRA is in your hands and ears. Audio quality is leagues ahead of any smartphone offering, and even lower-quality MP3 files have a fuller sound to them. Take note, though, that you must use high-quality headphones or speakers to notice the difference, and loading the NWZ-A15 with lossless files will fill it up in no time.

Bass has a lot of depth, and there's a clear, distinct range in all the tracks we played. You can apply custom equalizer settings if you wish, but frankly, we were happy with the preset ClearAudio+ option most of the time.

by Marvin R. Velasco

### AT A GLANCE

#### Display

2.2-inch TFT LCD  
(240 x 320)

#### Storage

16GB, expandable via  
microSD

#### Connectivity

Bluetooth, NFC

#### Weight

66g

#### Price

Php 8,999



The control scheme is really basic and reminds us of feature phones of the past.

### CONCLUSION

**If downgrading the interface and lessening the features provides us with High-Resolution Audio at a low cost, then the Sony Walkman NWZ-A15 is a welcome addition.**



TAP FOR  
WEBSITE



TESTED & RATED

**8.0**<sub>/10</sub>

**HWM**  
PHILIPPINES



## AT A GLANCE

**Sensor**  
APS-C CMOS

**Resolution**  
16.3 megapixels

**Dimensions**  
116.9 x 66.5 x 40.4mm

**Weight**  
300g (body only)

**Price**  
PhP 27,990  
(with XC 16-50mm f/3.5-5.6 OIS II lens)



The Fujifilm X-A2 now has an LCD that tilts up to a full 180 degrees for easy selfies.

## CONCLUSION

**The Fujifilm X-A2 is a no-fuss system camera that turns in acceptable results and matches the needs of users using interchangeable lens cameras for the first time.**

TESTED &amp; RATED

8.0/10

HWM  
PHILIPPINES

# Fujifilm X-A2

## X HITS THE SPOT

The X-A2 is virtually identical to the 2013's X-A1, with the exception of the rear LCD screen. Like most of this year's releases, it now tilts up to a full 180 degrees to facilitate easier selfies. There's no viewfinder of any sort, but it does feature a built-in Wi-Fi so you can send images directly to a connected smart device.

When flipped up fully, the camera automatically goes into selfie mode, using face and eye detection to help ensure everything is kept in focus. Now, this is important, as the LCD panel isn't touch-enabled, meaning that in selfie mode, you'll have to blindly fumble with the rear directional pad to shift focus points.

Coming back to the Eye Detect autofocus, we thought that while it seemed to work decently well in terms of locating and tracking eyes, it seemed a little slow to readjust when our subject adjusted their pose.

We like that the X-A2

maintains two dials for better manual control of settings, but we do wish that Fujifilm had a change of heart and placed one of their X-Trans sensors inside, as that really is the distinguishing feature of the X-series. One consolation, though, is the fact that Fujifilm has added their "Classic Chrome" film simulation mode to the X-A2, so you can get somewhat closer to the colors that are the hallmarks of the X-series.

Paired with the new XC 16-50mm II f/3.5-5.6 OIS kit lens, the X-A2 feels comfortable in the hands, and the new lens gives better play when focusing manually. Because the lens focuses by wire, you can even switch the direction of focus in the menu settings.

Shooting with the X-A2 is a fuss-free affair. Focusing is fairly fast, but not always accurate if you're using the Multi autofocus mode. We prefer using the Area mode, as that lets you manually select the focus point using the

selector. While it doesn't sport an X-Trans sensor, the X-A2's APS-C CMOS sensor does seem to resolve a good amount of detail and color, which makes for vibrant images with good detail. We find that the images tend to have a bit of a cyan cast over them, though, which will require some correction in post.

By our estimates, the camera tends to go about half a stop under outdoors, but for our indoor tests, it seems to give accurate exposure, so perhaps there is something in the exposure algorithms that gives particular weightage to preserving highlights, resulting in the images being seemingly slightly underexposed.

Overall, we'd say that the X-A2 is a fairly competent camera that should more than match the needs of first-time users who are moving into the world of interchangeable lens cameras.

by Marcus Wong



# Nikon COOLPIX AW130

## INTO THE JUNGLE

Compact cameras have been playing catch-up with smartphones in terms of connectivity and software for a while now. It's been a losing battle for the dedicated snappers, with folks preferring the ease of use of handsets and their improved image quality. Point-and-shoot cameras need to step it up a notch, and Nikon's COOLPIX AW130 may have found ways to do so.

The allure of the AW130 is in its resistance to the elements. It's waterproof for up to 30m underwater, shockproof from heights of up to 2.1m, and can survive temperatures down to -10 degrees Celsius. It's practically invulnerable to everyday use and doesn't have to be handled like a baby. A sturdy cover with a locking dial reassures you that nothing will get in through the ports or SD card slot.

To keep everything tight and rigid, the controls had to be made tough as well. This made pressing

the buttons more difficult, compounded by how small some of them are. To make things a little easier during extreme conditions, Nikon added what it calls Action Control, which lets you adjust settings by flicking the camera. We didn't encounter any situation that needed it, but we understand how useful it could be at the right time.

Extensive connectivity options are another plus for the AW130. There's built-in Wi-Fi for wireless sharing of photos and videos, NFC for quick pairing with a compatible device, and GPS for recording the coordinates of your shots. We were also able to employ our Android smartphone as a remote trigger using the downloadable app from Nikon.

As for the image quality itself, we weren't too impressed. The 1/2.3-inch CMOS sensor and lens with a maximum aperture of f/2.8 produced photos and videos comparable to flagship smartphones. The shot-to-shot time was also rather slow, so we

had to rely on the continuous shooting mode (which goes up to 7fps) to make sure that we didn't miss any evasive moments. The AW130 managed to create punchy colors in daylight, but night shots were mostly noisy, especially at ISO levels beyond 800 (the camera can reach ISO 6400). On the bright side, optical image stabilization kept shots sharp at maximum zoom, and shooting underwater was pretty much fuss-free.

With a price of Php 19,990, the AW130 has a lot of stiff competition in the weather-sealed camera segment. This Nikon's advantage is its relatively large 3-inch OLED display, which is clear even underwater, and its long battery life that's rated at 370 shots. If you're into action-filled adventures and are afraid to use your smartphone as a primary shooter, then we can genuinely recommend the AW130.

by Marvin R. Velasco

### AT A GLANCE

**Resolution**  
16MP

**Sensor**  
1/2.3" CMOS

**Lens**  
24 - 120mm

**Aperture Range**  
f/2.8 - f/4.9

**Price**  
Php 19,990



Tapping a compatible device on the AW130's NFC spot will pair it instantly via Bluetooth.

### CONCLUSION

**Despite the stiff competition at this price point, we can wholeheartedly recommend the AW130 and its sturdy build as a primary shooter during your action-filled adventures.**

TESTED & RATED

**7.5**<sub>/10</sub>

**HWM**  
PHILIPPINES





TAP FOR  
WEBSITE

# Casio Oceanus OCW-G1000

## GEEK GENTRIFICATION

Casio is probably most well-known for its G-Shock watches that are relatively cheap, nearly indestructible, and command a cultural following that cannot be denied. They're as much a fashion accessory as they are a utilitarian.

The G-Shock GPW-1000, the first watch to feature Casio's Hybrid Wave Ceptor technology, which includes both radio and GPS receivers for time adjustment, is arguably more advanced than the GPS-only Seiko Astron or Citizen Satellite Wave. The GPW-1000 was also a steal, but it was still a chunky plastic G-Shock, while the Seiko Astron is more elegant with stainless steel and titanium variants.

Casio's answer is its ultra-premium Oceanus range. Some of the watches are still fully assembled in Casio's Yamagata factory in Japan and hand-finished by certified artisan watchmakers. Because of this, only a limited quantity can be

produced each month. The newest model, the OCW-G1000 now features that same Hybrid Wave Ceptor technology.

In terms of craftsmanship, its band, case, and bezel are made of titanium with two hardening treatment finishes: titanium carbide (silver) and diamond-like carbon (black). Its bezel is polished to a mirror shine via Sallaz polishing, and its crystal is dual-curved sapphire glass with anti-reflective coating on both sides. The end-result is a gorgeous marriage of the fine brushed metal look of the case and band with the clear, polished shine of the bezel and crystal.

For an analog watch, the OCW-G1000's movements are quite impressive with independent motors for each dial. We're talking about dual world time dials, an AM/PM dial, auto-calendar with day and date display, plus a 24-hour chronograph. Also, don't discount the space needed for the radio/GPS module, battery, and solar

panel – all in a case that's just 46.1mm wide and 14.7mm thick, with the whole watch practically featherlight at a mere 106g.

Watch operation is almost identical to the GPW-1000, as it uses the same GPS module. The only adjustment you need is the setting of home cities on the main or sub world time dials when traveling. Otherwise, it corrects time on its own just fine, but you can initiate manual syncing, too. Casio claims up to 18 months of battery on a full charge, but unless you're a vampire and don't plan on stepping into sunlight at all, this should never be a problem.

A word of warning, though, as wearing the OCW-G1000 had an effect of eroding our inner nerdy man-child. With thoughts of bespoke clothing and artisanal beverages of the shaken, not stirred kind, we dare say it made us feel like proper adults, digital smartwatches be damned.

by Zachary Chan

### AT A GLANCE

#### Power Source

Tough Solar power system

#### Water Resistance

100 meters

#### Dimensions

51.1 x 46.1 x 14.7mm

#### Weight

106g

#### Price

From S\$ 2,799  
(Approx. PhP 92,910)



An advanced shadow-dispersing solar panel covers the whole watch face, but can you see it?

### CONCLUSION

**A premium timepiece that commands a premium price, the Casio Oceanus OCW-G1000 brings tech sophistication into the old-school analog wristwatch.**

TESTED & RATED

**9.0** /10

**HWM**  
PHILIPPINES



# EnGenius EDS1130

## INTELLIGENT HOME GUARDIAN

Technology and safety are becoming more inseparable. As time goes by, more devices that focus on keeping our homes safe are made available. For instance, security cameras are becoming readily accessible even to non-commercial users. Furthermore, better features are packed into these cameras, so we don't miss anything at home even when we're away. In this review, we take a quick look at the EnGenius EDS1130 – an intelligent IP camera for day and night use.

The EDS1130 captures videos in 720p high-definition resolution. It may not be the best resolution that you can get, but it is acceptable for home video surveillance compared to older Closed-Circuit Television (CCTV) cameras that only record videos in black and white. Due to this resolution, however, you will need to set up more cameras to cover more spaces inside your home.

It records videos in H.264/MPEG-4/MJPEG triple codec.

For night recording, the camera is built with hidden IR LEDs that claim to capture footage to up to 16 feet. It was able to capture videos at night, but like other cameras, it struggles a bit to do so. Still, the recorded video is better and offers a big improvement in video quality compared to older CCTV cameras.

The camera can be accessed through its video homepage, which is compatible with most web browsers. The recorded video can be sent to a network-attached storage, a connected DLNA storage device, or a microSD card that supports up to 32GB that can be installed directly onto the camera. It also features Motion Detection that lets you set it up to just start recording when something moves within its frame. Testing it out, it was pretty responsive, as there was no noticeable delay in its recording.

A notable feature on the EDS1130 is the built-in

microphone and external audio-out. This means that you interact immediately to situations via this two-way audio feature. It offers a good platform for hands-free communication.

Another advantage of this product is it can be used with the EnGenius EnViewer mobile app, which you can download in the Apple App Store or Google Play for free. This app lets you monitor your home even on your mobile devices. Notifications can also be pushed to your devices, as you deem necessary. Setup is quite easy since the app will guide you along upon installation.

Although the EnGenius EDS1130 is designed for home use, it can also be a cost-effective security solution for small businesses. The security camera is easy to install, setup is quick, and the mobile app is free to give users the peace of mind needed even when away from home.

by Katrina D. Canlas

### AT A GLANCE

**Image Sensor**  
1/4-inch CMOS

**Lens**  
Fixed focus, 4mm, f/2.4

**Resolution**  
HD 720p

**Compression**  
H.264/MPEG-4/MJPEG

**Price**  
Php 5,699



On one side of the camera is a small slot where you can insert a microSD card with up to 32GB capacity.

### CONCLUSION

**Homes and small businesses can definitely benefit from the 24/7 capabilities and features that come with the compact EnGenius EDS1130 intelligent IP camera.**



TESTED & RATED

**8.5**<sub>/10</sub>

**HWM**  
PHILIPPINES



## AT A GLANCE

**Processor**

Intel Core i7-4790 at 3.6GHz (Turbo Boost up to 4GHz) with 8MB L3 cache

**Graphics**

NVIDIA GeForce GTX 970

**Memory**

2x 8GB DDR3

**Weight**

6.38kg

**Price**

S\$ 2,699  
(Approx. PhP 91,030)



The ROG G20 features a distinctive Mayan-inspired mesh design at the top and front.

# ASUS ROG G20AJ

## (PRE)BUILT FOR GAMERS

The ASUS ROG G20AJ is a high-performance gaming PC fitted into a compact 12.5L case. The sleek chassis is one of the standout features of the ROG G20AJ, with its signature ROG red-and-black color scheme, matte black side panels, and a striking narrow, red I/O front panel.

Designed to command influence on the small-form-factor gaming desktop segment, the ASUS ROG G20AJ has ditched the traditional boxy outlines of most PC cases in favor of more unique geometries and bold angles. The front and top of the ROG G20AJ's case feature a Mayan-inspired mesh design, which is combined with the front red LED lighting for an aggressive, futuristic look.

Moving around to the back of the chassis, we see that the graphics card has been rotated 90 degrees to sit flat against the motherboard. This is partly how ASUS has managed to maintain such a slim profile

with a full-sized NVIDIA GeForce GTX 970 graphics card.

The chassis, which is said to be capable of supporting up to 12.5 Liters, lacks any dedicated rear exhaust vents for the CPU, and ASUS has instead chosen to install vents below the mesh design at the top to take advantage of natural thermal convection. Upon opening up the chassis, we found that the internal blowers are also aligned to exhaust upwards, further helping with the cooling.

ASUS has placed quite a lot of emphasis on the ROG G20AJ's thermal design, which it says uses natural convection and has been specially engineered for silent operation. In our tests, we found this to be quite true – save for an audible whirr when powering up, the ROG G20AJ was quite silent throughout.

Powered by a quad-core Intel i7-4790 processor and a NVIDIA GeForce GTX 970 graphics card, the ROG G20AJ has the hardware to match its modern design.

In our gaming benchmarks, the ROG G20AJ handled the demanding *Middle-earth: Shadow of Mordor* well, posting a more than respectable 73.45fps with all the settings cranked up. In *Grand Theft Auto V*, the ROG G20AJ managed a very playable 42fps with all the graphics set to Very High. With these performance numbers, the ROG G20AJ should have no problem handling most modern games available in the market today.

The version we reviewed here is from Singapore, but there's a more affordable local variant with a weaker GeForce GTX 745 and a 1TB HDD that costs PhP 63,995. This gaming PC is targeted at a niche audience that expects pre-assembled systems that perform well, which is exactly what the ROG G20AJ delivers. It boasts an excellent design and quiet yet powerful processing, making it a great option for those who choose to avoid the DIY route.

by Koh Wanzhi

## CONCLUSION

**The ASUS ROG G20AJ is a sleek, high-performance, and convenient alternative to a DIY PC, targeted at a niche audience. It may be pricey, but its price is quite justifiable.**

TESTED &amp; RATED

# 8.0

**HWM**  
PHILIPPINES



# ASUS Strix GeForce GTX 970

**AFFORDABLE YET CAPABLE**

The ASUS Strix GeForce GTX 970's GPU has the same 28nm GM204 as the GeForce GTX 980, but with lower unified shaders, Texel Fillrate, and Pixel Fillrate. Its GPU clock runs at 1114MHz that boosts up to 1253MHz, and it has 4GB of memory that is rated at 1175MHz with a 256-bit bus width. Its connectivity options, on the other hand, consist of two DVI ports, one HDMI, and one DisplayPort.

Unlike the GTX 980, which requires a 6-pin and 8-pin power connectors, the Strix GeForce GTX 970 only requires one 8-pin power connector from the power supply unit. And, same with the GTX 980, this card also supports a 3-way SLI configuration. With almost the same specifications as the GTX 980, we expect this card to perform as well as the GTX 980 that we reviewed in our March issue.

Armored with the black Strix cooler, the GTX 970 carries the same exclusive technology as the other Strix-equipped cards,

and sporting the DirectCU II, combined with ASUS' 0dB fan, it allows you to play your favorite MOBA games silently. Take note, though, that the fans will only start to cool the card when a certain temperature is reached. Like with any other ASUS high-end graphics card, the GTX 970 is also equipped with DIGI+ VRM and Super Alloy Power that reduce the noise coming from the card and imbue it with longer life.

To know if the GeForce GTX 970 variant of Strix could perform as good as the GeForce GTX 980 model, we put it up against famous benchmarking applications and some of the most recent game titles. We fired up 3DMark 11 first, and it was able to pull out a score of X5030 on extreme settings and P13784 on the performance settings. On the Heaven Benchmark, it was able to hold an average of 53.8fps at 1080p. The scores it got weren't far from the scores of the Strix GTX 980

card. The scores it got were pretty impressive, and knowing that this card will easily output our game tests on 1080p with high FPS, we decided to start the tests on 4K resolution.

The first test was *Battlefield 4*. All settings were on ultra, but anti-aliasing was off, and it was able to reach an average of 38.3fps. On our second test, which was *Call Of Duty: Advance Warfare*, the GTX 970 was able to hold an average of 34.5fps, and it was able to maintain the temperature at around 64 degrees on full load.

With the scores it got from our tests, we can easily say that the ASUS Strix GeForce GTX 970 can not only run whatever game you throw at it at mid to high settings, at 1080p, but it can also output it up to 2560 x 1600 pixels. With a little tweak on the settings, you can also enjoy your favorite games with a reasonable FPS on the 4K resolution.

by Jasper Oregas

## AT A GLANCE

**GPU**  
GM204

**GPU Clock**  
1114MHz  
(Boost: 1253MHz)

**Memory**  
4GB

**Connectivity**  
2x DVI, 1x HDMI,  
and 1x DisplayPort

**Price**  
PhP 19,690



The 0dB fan technology lets you play your favorite MOBA games as silently as possible.

## CONCLUSION

**If you're eyeing a card that can make your build future-proof, the Strix GeForce GTX 970 is a good choice. It can run most games you throw at it at resolutions of up to 2560 x 1600.**



TAP FOR  
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TESTED & RATED

**8.5**<sub>/10</sub>

**HWM**  
PHILIPPINES

# FUTURE QUEEN OF COSPLAY

Anicka Lyka Yu talks about her love  
for everything pretty.

Text by **The HWM Team**

Photography and Art Direction by **Victor Felix Pulgar**

Special Thanks to **RED Glam Team**

Make-up by **Kanjie Nocillado**

Hair by **Franz Tancioco**

Styling by **Jenny "King" Sibulo**





**How's life been treating you lately?**

Feeling ko sobrang blessed ako ngayong 2015, kasi naging magaan lahat ng nangyayari sa buhay ko. Puro big blessings! Sobrang thankful ako this year.

**Other than modeling, what do you do for a living?**

Minsan 'pag umuwi ako sa Quezon, tinutulungan ko ang pamilya ko sa family business namin. Tinutulungan ko ang pamilya ko 'pag wala akong ginagawa.

**You seem very active on social media! How many selfies do you normally take in a day?**

OMG! Alam mo ang feeling na kakabili mo lang ng phone tapos meron nang one thousand photos kaagad sa storage. Kakabili mo lang tapos 'yun na 'yun! Sa isang araw, inaabot ako ng fifty. Normal lang 'yun para sa akin!

**Do you consider yourself a gadget lover?**

Sobra! Pagdating sa gadgets, mahilig ako mag-explore. Tinitingnan ko kung ano 'yung mga different features nila.







**"Kung may opportunities, grab it!"**

**What's it like representing the MyPhone brand?**

For me, sobrang big deal na nag-endorse ako ng MyPhone. Simula nun, nagkaroon ako ng maraming open doors. Dumami ang mga opportunities ko dahil sa MyPhone.

**Do you have any upcoming projects?**

Meron akong bagong pinasok na modeling career, cosplay!

**Have you been thinking of cosplaying for a long time now, or did it just happen recently?**

It just happened recently. Kahit sa modeling, wala akong plano. Nangyari lang. Much better 'yung ganun na hindi mo masyadong napaplano. May thrill kasi laging bago!

**Is this something you plan to do in the long term?**

It depends. If ever okay naman ang flow, why not? You live every day, so make the most of it. Kung may opportunities, grab it!









## MYPHONE INFINITY 2 LITE

### SPECIFICATIONS

5-inch IPS HD display  
1.4GHz Octa-core CPU  
2GB RAM  
16GB Internal Storage  
with microSD slot  
13MP rear camera  
5MP front camera  
Dual-SIM  
2400mAh battery  
Android 4.4.2 KitKat





# COOLER, FASTER MAINSTREAM

With the NVIDIA GeForce GTX 960, gamers looking for faster performance and cooler temperatures can have their cake and eat it, too. Here are the three cards from ASUS, Gigabyte, and MSI that take full advantage of the improved power efficiencies of the GM206 GPU with their own custom cooling solutions and frequency tweaks.

Text by Koh Wanzl

Photography by Tan Wei Te + Zaphs Zhang

Art Direction by Ian Chong



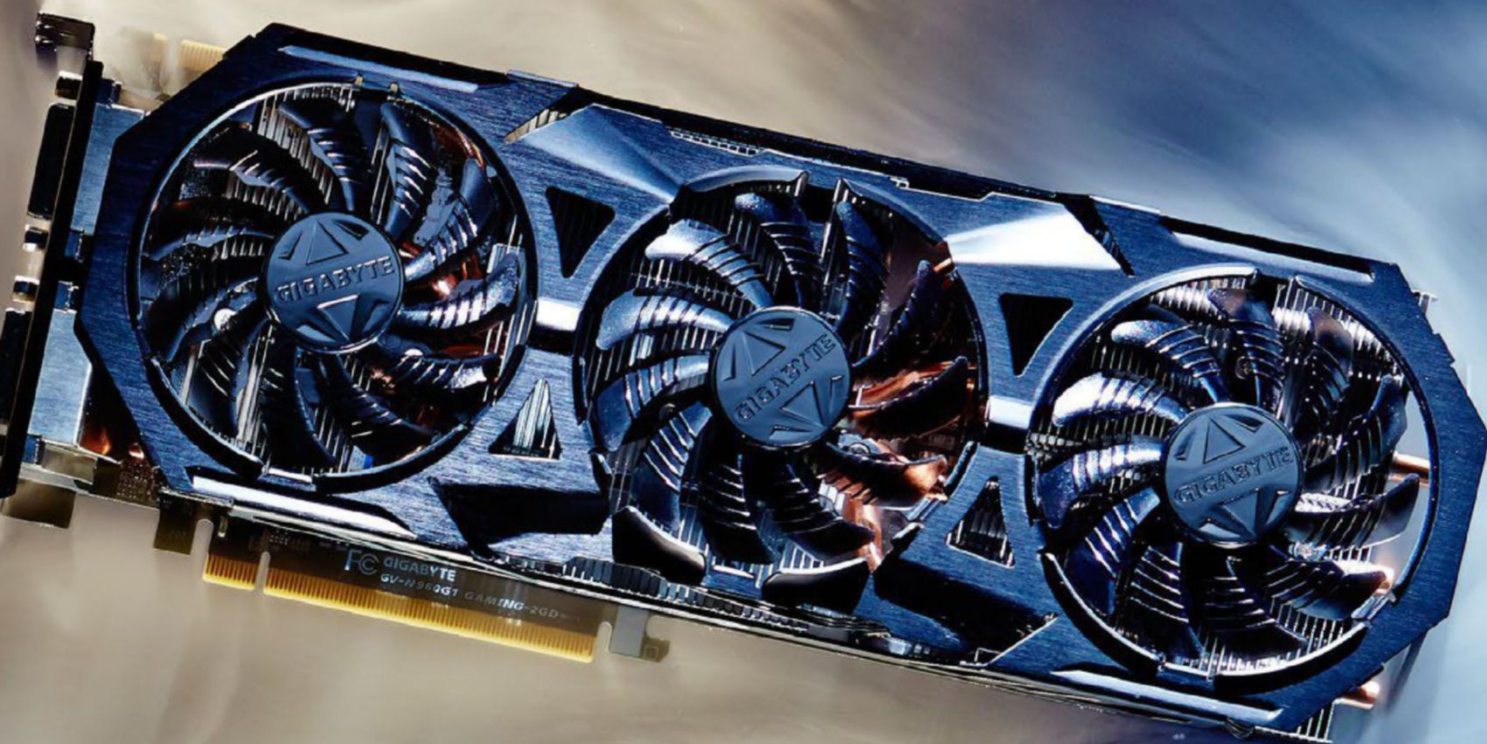
VS

ASUS STRIX GEFORCE  
GTX 960 OC

GIGABYTE GEFORCE  
GTX 960 G1 GAMING

MSI GEFORCE GTX 960  
GAMING 2G







## ASUS STRIX GEFORCE GTX 960 OC

When you look at the Strix GeForce GTX 960 OC, it quite literally stares back at you. Its twin fans and black cooling shroud are styled to resemble a pair of piercing red eyes. Its 5-phase power design system is driven by the usual Super Alloy Power (SAP) VRM components for smoother power delivery. There is also a dedicated SAP capacitor located behind the GM206 GPU to further augment input stability. This is not visible, though, because of the card's rear metal backplate, which provides extra rigidity and passive cooling for the card's PCB.

The heft of the cooling work is done by ASUS' DirectCU II cooling system with 0dB fan technology, which keeps its temperatures and noise levels down. The pair of cooling fans will stop spinning when the GPU core temperature is below 65 degrees Celsius, which means you should be able to enjoy silence during light gaming sessions. But when they are in operation, the fans cool the oversized aluminum heatsink with four embedded, 10mm heatpipes.

The card operates in OC mode by default, with slightly ratcheted up base clock speed of 1253MHz and boost clock speed of 1317MHz. The card also has

a Gaming mode, with a rated base clock of 1228MHz and boost clock of 1291MHz. Gamers will be able to toggle between both modes using ASUS' GPU Tweak software – ASUS own overclocking and monitoring utility that allows enthusiasts to adjust parameters such as clock speeds, voltages, and fan speeds for maximum performance.

We noticed, however, that the performance modes set by the Power Saving and Overclocking buttons in ASUS GPU Tweak do not conform to the official specifications of the card. For instance, the Power Saving button set the card's base clock speed to 1204MHz and boost clock to 1267MHz, which were lower than the speeds specified on paper. Only the Default button performed as expected, as enabling it puts the card in OC mode with operating frequencies that match the official specifications.

For video connectivity, the card features three DisplayPort outputs, one HDMI 2.0 port, and one dual-link DVI-I connector. It is powered by a single 6-pin PCIe connector. An onboard LED indicator will turn white if the power cable is plugged in properly, which should help in troubleshooting.

**+  
Decent out-of-the-box performance.**

**–  
High operating temperatures and power draw. ASUS GPU Tweak profile settings do not match official specs.**

TAP FOR  
WEBSITE



### AT A GLANCE

**GPU Transistors**  
2.94 billion

**Core Clock**  
1228MHz

**Memory**  
2GB GDDR5

**Memory Clock (DDR)**  
7200MHz

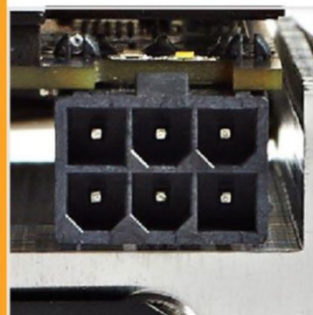
**Price**  
PhP 10,770



The card's four 10mm heatpipes are the thickest of the lot, drawing heat away from the GM206 GPU.



The solid metal backplate of the ASUS card provides protection and passive cooling for the PCB.



The Strix GeForce GTX 960 OC can be powered by just a single 6-pin PCIe power connector.



## GIGABYTE GEFORCE GTX 960 G1 GAMING

The Gigabyte GeForce GTX 960 G1 Gaming is clearly a card that is serious about cooling. Its WindForce 3X cooling system comprises three cooling fans and a black cooling shroud and heatsink. No thanks to the three-fan design, though, it makes the card the longest in the lineup, measuring 295mm in length as compared to the 215.2mm ASUS card and 267mm MSI card, so make sure your PC case has enough clearance.

The card's out-of-the-box clock speeds sit right in the middle of the pack at a 1241MHz base and 1304MHz boost. It is the only card to not feature alternative operating profiles for quick clock speed adjustments. Like the ASUS card, it also has a metal backplate that provides structural support and passive PCB cooling. The backplate is perforated in places, with cutouts that have been arranged to fan out from the center, exposing the capacitors located directly behind the GM206 GPU (these were all hidden under the backplate of the ASUS card).

The fan shroud also has LED lighting that helpfully indicates the operating status of the fans, where the "Silent" and "Stop" indicators will light up when the cooling fans stop spinning under low-load conditions.

The WindForce 3X cooler is equipped with pure copper heatpipes that are in direct contact with the GPU, which help improve heat dissipation. The 11-blade fans have striations down their flat side, and are designed to improve cooling while reducing air turbulence around the blades and bring about lower noise levels.



**Good performance despite not having the highest clock speeds.**



**May not fit in smaller PC cases due to its long length.**

Unlike the other two cards, the GeForce GTX 960 G1 Gaming from Gigabyte will require two 6-pin PCIe power connectors. The Gigabyte card sports a dual-link DVI-D port, in addition to a dual-link DVI-I port, HDMI 2.0 port, and three DisplayPort connectors. This card supports Gigabyte's Flex Display technology, which allows users to have more options when they choose to have multi-display configurations. Some gamers may not own multiple displays with DisplayPort connectivity, but the additional DVI-D port on the Gigabyte card will still allow these gamers to enjoy a "4K surround" experience using a pair of displays with DVI outputs and another that supports DisplayPort technology. But, for gamers to enjoy a full "4K surround" experience, three DisplayPort displays are still required.

TAP FOR

WEBSITE



### AT A GLANCE

**GPU Transistors**  
2.94 billion

**Core Clock**  
1241MHz

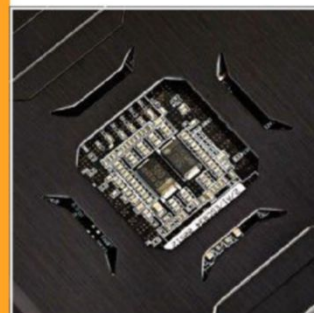
**Memory**  
2GB GDDR5

**Memory Clock (DDR)**  
7010MHz

**Price**  
Php 16,550



The card features an additional dual-link DVI-D connector for support of Gigabyte's Flex Display technology.



The perforated metal backplate features a cutout that exposes the capacitors behind the card's GPU.



The WindForce 3X cooling system makes this Gigabyte card the longest card in the lineup.



## MSI GEFORCE GTX 960 GAMING 2G

The MSI GeForce GTX 960 Gaming 2G stands out with the aggressive design of its cooling shroud, which is black with bold accents of red that practically ooze gamer cred. Diving under the hood, the card has a default base clock speed of 1216MHz and a boost clock of 1279MHz. In fact, its overclocked profile is the least aggressive among the three cards compared here. The GTX 960 Gaming 2G card ships with three official operating modes: in OC mode, its GPU core operates at 1241MHz (boost clock speed: 1304MHz), in Gaming mode, its base clock speed is 1190MHz (boost clock speed: 1253MHz), and in Silent mode, the card runs at 1127MHz (boost clock speed: 1178MHz). The card's 2GB of GDDR5 video memory is set at 7010MHz, regardless of the active mode.

MSI's Twin Frozr V cooling system here sports dual 100mm Torx fans over a nickel-coated GPU heatsink, based on MSI's SuperSU architecture. According to MSI, the GPU heatsink is connected to 8mm-thick heat pipes, which are laid out for more efficient heat dissipation by reducing the length of unused heat pipe.

Like the ASUS and Gigabyte cards, MSI's Zero

Frozr technology stops the fans from spinning in low-load situations for quieter operation. Uniquely, Torx fans are able to spin independently of each other, which should help further manage noise even when active cooling is required. With the MSI Gaming App, you can control the LED lighting of the MSI Gaming dragon insignia through a total of five operational modes. The app also lets you toggle between the three performance profiles and customize your screen's display profile with its Eye Rest feature.

The MSI GeForce GTX 960 Gaming 2G, however, is the only card to lack a rear backplate, which helps the card maintain its thin, less-than-two-slot profile. The card is just 36mm thick, as compared to the 40.9mm of the ASUS card and 43mm of the Gigabyte. Gamers intending to run these cards in SLI will probably appreciate the resulting extra clearance and

airflow, although some users may still miss the extra rigidity and protection that a backplate offers. Finally, on the video connectivity front, the card has three DisplayPorts, an HDMI 2.0 port, and a dual-link DVI-I port. In addition, the GTX 960 Gaming 2G is powered by a single 8-pin PCIe connector.



**Twin Frozr V cooler succeeds in cooling the card quite well.**



**Lacks the structural support of a metal backplate.**

TAP FOR  
WEBSITE 



## AT A GLANCE

**GPU Transistors**  
2.94 billion

**Core Clock**  
1127MHz

**Memory**  
2GB GDDR5

**Memory Clock (DDR)**  
7010MHz

**Price**  
\$369  
(Approx. PHP 12,244)



The card does not have a metal backplate and features an exposed PCB for a slimmer profile.



The 100mm Torx fans will stop spinning when the GPU's load falls below a certain threshold.



The card has three DisplayPort connectors, one HDMI 2.0 port, and a dual-link DVI-I port.

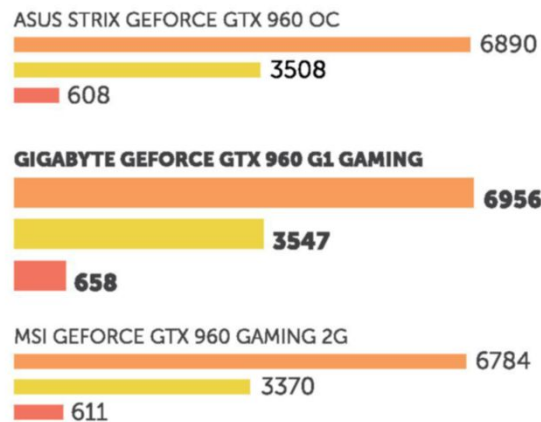


## 3DMark 2013

(Higher is better)

The ASUS GTX 960 OC card was expected to be the winner in our gaming benchmarks, as it rolled off the factory floors with the most aggressive OC profile. It was, however, the Gigabyte card that pulled ahead most of the time. And, although the MSI card sits behind its ASUS and Gigabyte counterparts, the performance differential is not too significant.

- Fire Strike
- Fire Strike Extreme
- Fire Strike Ultra

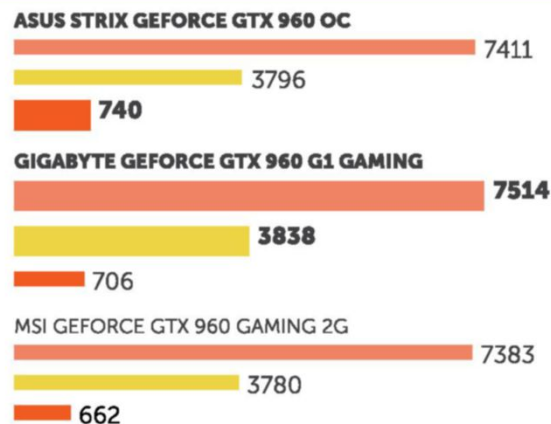


## Overclocking

(Higher is better)

The Gigabyte card was the clear winner while the ASUS card was the runner-up. We managed to overclock the winning card to a high of 1341MHz for its base clock. In its overclocked state, its boost clock speed was 1404MHz. Its memory modules were overclocked to a high of 7620MHz, which was about 8 percent higher than the default 7010MHz. Despite reaching higher overclocked speeds than the Gigabyte card, the ASUS card trailed behind, as its memory modules could only be pushed to 7556MHz, which was about 1 percent lower than the Gigabyte.

- Fire Strike
- Fire Strike Extreme
- Fire Strike Ultra

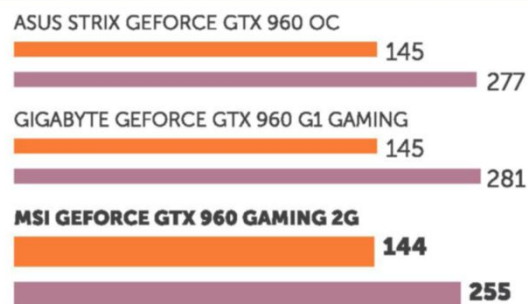


## Power Consumption

(Watts, lower is better)

The MSI card had the lowest power draw of 255W under load. ASUS and Gigabyte weren't as efficient here, which is to be expected because they operate at higher clock speeds.

- Idle @ Windows Desktop
- Load @ Gaming in 3DMark 2013 (Extreme)



## Temperature

(Degrees Celsius, lower is better)

The Twin Frozr V cooling system on the MSI card managed to keep the GM206 graphics core of the MSI card running coolest at 57 degrees Celsius, probably due in part to its base clock speed of 1216MHz – the lowest of the lot. The Gigabyte card performed fairly well at 59 degrees Celsius, considering its higher clock speeds.

- GPU Core





MODEL	ASUS STRIX GEFORCE GTX 960 OC	GIGABYTE GEFORCE GTX 960 G1 GAMING	MSI GEFORCE GTX 960 GAMING 2G
CORE CODE	GM206 (28nm)	GM206 (28nm)	GM206 (28nm)
GPU TRANSISTOR COUNT	2.94 billion	2.94 billion	2.94 billion
CORE CLOCK SPEED	Gaming mode: 1228MHz (Boost clock: 1291MHz) OC mode: 1253MHz (Boost clock: 1317MHz)	1241MHz (Boost clock: 1304MHz)	Silent mode: 1127MHz (Boost clock: 1178MHz) Gaming mode: 1190MHz (Boost clock: 1253MHz) OC mode: 1241MHz (Boost clock: 1304MHz)
STREAM PROCESSING UNITS	1024	1024	1024
TEXTURE MAPPING UNITS (TMU)	64	64	64
RASTER OPERATOR UNITS (ROP)	32	32	32
MEMORY	2GB GDDR5	2GB GDDR5	2GB GDDR5
MEMORY CLOCK SPEED (GDDR5)	7200MHz	7010MHz	7010MHz
MEMORY BUS WIDTH	128-bit	128-bit	128-bit
MEMORY BANDWIDTH	115.20GB/s	112.16GB/s	112.16GB/s
PCI EXPRESS INTERFACE	PCIe v3.0 x16	PCIe v3.0 x16	PCIe v3.0 x16
VIDEO PORTS	1x dual-link DVI-D, 1x HDMI 2.0, 3x DisplayPort	1x dual-link DVI-D, 1x dual-link DVI-I, 1x HDMI 2.0, 3x DisplayPort	1x dual-link DVI-D, 1x HDMI 2.0, 3x DisplayPort
HDCP OUTPUT SUPPORT	Yes	Yes	Yes
PRICE	PhP 10,770	PhP 16,550	S\$ 369 (Approx. PhP 12,244)



# AND THE BEST GEFORCE GTX 960 GRAPHICS CARD IS...



## MSI GEFORCE GTX 960 GAMING 2G

Based on our benchmarks, the Gigabyte GeForce GTX 960 G1 Gaming did well in both performance and overclocking. Since we're looking at mainstream gaming here, however, the MSI GeForce GTX 960 Gaming 2G has a better overall proposition based on its attractive price point, consistent performance, and, most importantly, lower temperatures and power draw. Its stellar Twin Frozr V cooler design proved to be the most dynamic cooling solution of the lot. In the end, it was the only card to hit all the right check marks for what a custom GeForce GTX 960 graphics card should be.



vs  
ASUS STRIX TACTIC PRO  
•  
LOGITECH G910  
ORION SPARK  
•  
RAZER BLACKWIDOW  
CHROMA  
•  
ROCCAT RYOS TKL PRO

# ALL-AROUND GAMING KEYBOARDS

No matter how you look at it, a keyboard is as essential a part to PC gaming as a graphics card. You can have the latest hardware to run games, but what good is it if you're not enjoying the experience? Gaming is as much a tactile experience (hence, the popularity of rumble feedback) as it is visually, which is why we're following up last issue's gaming mouse shootout with a mechanical keyboard one.

Text by *Salehuddin Husin*

Photography by *Tan Wei Te + Zaphs Zhang*

Art Direction by *Ian Chong*







## ASUS STRIX TACTIC PRO

The ASUS Strix Tactic Pro is an anomaly in the ASUS stable, as it's one of the more expensive peripherals they've produced, overshadowing even its own premium ROG brand. It is the second most expensive keyboard in this shootout and the heaviest of the lot. It's big, it's firm, and it's overflowing with macro keys.

You have macros under your thumbs and two whole rows of macros on the left, and even the F1 to F12 keys double as macros. If you're an MMO player, this keyboard should be right up your alley. To top it off, it also has physical media keys and a neat little volume roll bar. You'll see this in the Logitech G910, as well, though the one on the Tactic Pro is a bit stiffer with less give. To manage all these keys, ASUS throws in a great configuration utility that's pretty functional.

While it seems impressive, at first, the excessive number keys make the keyboard a little awkward to use. Our left hand had quite the workout, which was especially discomfoting when you cannot afford to lift your finger off the WASD keys while gaming. Then there are the thumb macros. The Roccat is the other keyboard that has

this feature, and both feel off.

Perhaps one of the reasons is because the Tactic Pro doesn't have

a wrist rest. It also comes with very short stands. Our thumbs and fingers always felt like they had to travel more than they had to in order to reach the intended keys. One consolation, though, is that the ASUS Strix Tactic Pro thumb buttons were better raised and rounded, which helped us identify what we were pressing.

Our Tactic Pro review unit used Cherry MX Red switches, though its product page shows that you can get them in any of the other Cherry MX colors, as well.

The Strix Tactic Pro is a solid gaming mechanical keyboard, but we felt that ASUS may have gone a little too far in trying to put as many macro keys on it as possible. While they were functional and a boon for MMO players, its implementation requires a learning curve where you'd

initially have to keep glancing down to see if you're pressing the right keys. As the largest keyboard here, it also means that your fingers need to travel longer distances.



**Tons of customization.  
Solid build.  
Distinguishable thumb  
buttons.**



**Awkward to use.  
Huge.**



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### AT A GLANCE

Switch	Dimensions	Weight	Price
Cherry MX Red	564 x 240 x 85mm	2.3kg	US\$ 150



The Volume roll bar on the ASUS Strix Tactic Pro is stepped, like a mouse wheel.



Thumb buttons are of different shapes and sizes, easily recognizable by feel.



Two rows of macro keys at the sides make the Tactic Pro the longest keyboard here.



## LOGITECH G910 ORION SPARK

The G910 is one of the few mechanical keyboards around that doesn't use any of the popular mass-produced switches from Topre or Cherry. Instead, Logitech uses its own design, dubbed Romer G, which the brand claims to be faster than conventional mechanical switches.

The Romer G keys are pretty similar to Cherry Brown keys, though they have a bit more resistance to them. While Browns are easily depressed, you need a bit more force to push down Romer G keys. Romer G stem and keycaps are also proprietary. The square stems allow more light to pass through, which makes the G910's keys brighter than the other keyboards in the shootout. On top of that, its keycaps are concaved, with angled sides that lead your finger right to the middle of the button, and it actually works once you get used to them.

The G910 also has an Arx Dock, which is just a fancy name for a smart device holder. It's a small inclusion, but it's unique and useful. Both tablets and phones can be slotted in and removed without issue, so you can easily use your smart device as a second screen to display guides or videos when

you're gaming.

Like the ASUS Strix Tactic Pro, the G910 has quite a bit of macro and shortcut keys going on. Unlike ASUS' macro and shortcut keys, however, Logitech's keyboard tries to fit them around existing keys for easier access. For example, instead of two rows of macros to the far left like the ASUS ones, the G910 has just one row, while the second row of four keys is located above F1 to F4. With this setup, both rows of macros (Logitech calls them G-keys) are within easier reach without either overstretching our fingers or having to lift up and move our hand to press a macro key.

The downside to the Logitech G910 Orion Spark is mainly its price. At US\$ 180, it's one of the more expensive keyboards in this shootout and a serious investment for any gamer, considering that it uses its own custom switch design, which limits off-the-shelf replacement parts. This also limits moving from one keyboard to another. Plus, for this price, we expected better materials used. Its use of plastic keeps it lightweight enough, but we would have liked a little more heft.

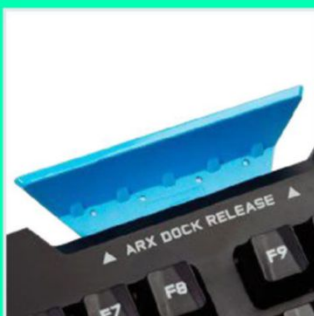
**+**  
**Arx Dock has its uses.**  
**Smooth volume roll bar.**

**-**  
**Custom switch might be**  
**troublesome to repair.**  
**Expensive.**



### AT A GLANCE

Switch	Dimensions	Weight	Price
Logitech Romer G	505 x 210 x 35.5mm	1.5kg	US\$ 180



The Arx Dock on the Logitech G910 is basically a fancy tablet or phone holder.



The G910 does have a set of macro keys, but nowhere near as many as in the ASUS Tactic Pro.



The specialized Romer G keys have a square stem, unlike those of the Topre and Cherry versions.

## RAZER BLACKWIDOW CHROMA

The BlackWidow Chroma is another keyboard in Razer's much-loved BlackWidow line. It does feature some design tweaks, but the main features here are the gorgeous backlights that cycle colors as you type. You can configure them to do other things, too, if you prefer, or find it too distracting. The backlights fill the whole keyboard; not only are the keys illuminated, the spaces in between them are, too, which make for a really cool effect.

The keyboard also has the longest stands among the rest, which we love. They aren't adjustable, however, so if you're not sure whether you are comfortable with such a steep angle or not, you might want to try out the Chroma at a shop first.

The Chroma is the other keyboard that uses custom mechanical switches, and, like Logitech, Razer also claims to have superior capabilities compared to your standard switches. Having used the Chroma for a while, we'd say they are a cross between Logitech's Romer G and Cherry MX Browns. They're not as heavy as the Romer G, but don't have the springy nature of the Cherry MX Browns. It's great for typing and playing, but it is

significantly noisier. Buying rubber rings might not be a bad idea if you're planning on using the Chroma in the office. Unlike Logitech, though, the Chroma is compatible with standard Cherry keycaps.

Key layout is very minimalistic, and after playing with both the ASUS and Logitech, it may not be a bad thing. Otherwise, the Razer BlackWidow Chroma does offer fully programmable keys, anti-ghosting features, and on-the-fly macro recording.

The BlackWidow keyboard can also serve as a pass-through, as it has audio jacks and a USB port on the side. It's great, except the keyboard uses two USB 2.0 ports (or one USB 3.0) on whatever machine you're connecting it to. Since it has audio pass-through capabilities, that means you also get two more cables (for the audio) on top of the two USB cables. As the cables aren't detachable, it can get a bit messy.

Minor gripes aside, the BlackWidow isn't that bad of a keyboard. It's not flawless, but it's far from being the worst mechanical keyboard out right now.



**Great looks and feel.  
Custom switches with  
Cherry stems.  
Built-in USB port and  
audio jacks.**



**Noisy. No wrist rest.  
Weak indicator lights.**

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### AT A GLANCE

Switch	Dimensions	Weight	Price
Razer Mechanical Switch	475 x 171 x 39mm	1.5kg	\$S 159.9 (Approx. PhP 5,306)



The extra macro column is the only standout in an otherwise generic design.



The backlights are under the keycaps, filling in the spaces between them.



The BlackWidow Chroma is the only keyboard with audio pass-through.



## ROCCAT RYOS TKL PRO

The Ryos TKL Pro is the latest in Roccat's line of mechanical keyboards. The one we have for review uses Cherry MX Red switches. Roccat is also offering the keyboard in different Cherry varieties, though.

For gamers who don't have lots of space, the Ryos TKL Pro is a great option. It might be missing a numpad, which makes entering numbers a chore, but the Easy Shift [+] function more than makes up for it. Since they effectively double the available keys, you can map shortcuts and functions, too. If you have a Roccat mouse with Easy Shift [+], you can easily pair it with the keyboard. When paired, you can use the peripheral's Easy Shift [+] button to toggle the alternate commands.

Per-key illumination sure seems cool on paper, but using it is another thing. The top row of the keyboard (from ESC to Break), WASD, and arrow keys are constantly illuminated, while the rest fade in and out as you use them. It really defeats the purpose of having backlights in the first place, since you need to hit the keys to light them up. Also,

we have encountered weird issues, wherein they sometimes don't turn on after you hit a key, while other times they seem to linger longer than usual.

Like the ASUS keyboard, there are extra macros below the spacebar. Roccat calls theirs "Thumbster" keys, and, like ASUS, we still felt the macro keys were awkward to actually make use of. Otherwise, the Ryos TKL Pro was actually one of the most comfortable keyboards to use due to its jumbo wrist rest. Despite being made of plastic, the Roccat keyboard does its job well, is stable, and is smooth enough to allow sliding of our wrists while typing without any issues.

The Roccat Ryos TKL Pro might be the shortest and lightest keyboard in this shootout because of its Ten Key Less design, but by no means does it shortchange gamers in terms of available customization. Roccat's Easy Shift [+] is still probably the most elegant manner of increasing available keys used for macros, resulting in much more usable keys than most.

**+**  
**Easy Shift [+] doubles available keys. Great tactile response from switches. Large integrated wrist rest. Can pair with Roccat mouse with Easy Shift [+] key.**

**-**  
**TKL means the loss of the numpad. Per-key illumination doesn't work right.**



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### AT A GLANCE

Switch	Dimensions	Weight	Price
Cherry MX Red	404 x 233 x 33mm	1.25kg	\$S 189 (Approx. PhP 6,274)



The Thumbster keys are a good idea, but too flat to tell them apart by touch alone.



The jumbo wrist rest might look out of place on the Ryos TKL Pro, but it is very comfortable.



LED indicators are squared away beside the Enter key, making them a bit hard to read.

				
MODEL	ASUS STRIX TACTIC PRO	LOGITECH G910 ORION SPARK	RAZER BLACKWIDOW CHROMA	ROCCAT RYOS TKL PRO
SWITCH	Cherry MX Red	505 x 210 x 35.5mm	Razer Mechanical Switch	Cherry MX Red
DIMENSIONS	564 x 240 x 85mm	1.5kg	475 x 171 x 39mm	404 x 233 x 33mm
WEIGHT	2.3kg	45cN	1.5kg	1.25kg
ACTUATION FORCE	45cN	US\$ 180	50cN	45cN
PRICE	US\$ 150		S\$ 159.90 (Approx. PhP 5,306)	S\$ 189 (Approx. PhP 6,274)

## THE FORCE BEHIND THE SWITCHES: TOPRE AND CHERRY

If you've done research and read up on mechanical keyboards, Topre and Cherry keys are mentioned everywhere, but where exactly did they come from?

Topre switches came from a Japanese company called Topre. Topre switches feature incredibly low actuation points, which means even the slightest pressure can trigger the switch. Their lowest actuation point is 30cN, and their highest is at 55cN. Their stems also differ from the Cherry ones, as they are rounded. Topre keycaps are supposedly more stable because of this.

Cherry Corporation is the company behind the Cherry switches. While the corporation has been bought over, and is now part of the ZF Electronics conglomerate, the company still uses its name and branding on its products. Cherry keys, like Topre keys, come in a multiple varieties, with the most famous being the Red and Brown Cherry MX keys. Cherry keys have higher actuation points than their Topre counterparts. The lowest actuation point is at 45cN, found only on the Cherry MX Brown and Red switches. Their highest actuation point is at 70cN, found exclusively on the rare Cherry MX Green switch. Cherry stems are + shaped, which can sometimes lead to the keys being stuck if hit wrongly.

## NOT ALL KEYCAPS ARE CREATED EQUAL

When choosing a mechanical keyboard, the type of switch used in it isn't the only thing worth noting. The keycaps themselves can play a big role on how comfortable a keyboard can be. There are four types of keycap printing methods (detailed on the right), each with their own pros and cons.



The fonts on the keycaps are also different.

**Pad Printing:** The most common. Pad-printed letters are like stickers placed on top of the keycaps.

- + Low cost
- + Easy to use multiple colors on a single keycap
- The printing sticks out
- Wears out fast

**Laser Etching/Engraving:** Lasers or other instruments are used to burn/carve in the letters on the keycaps.

- + Lasts a long time
- + Unique look
- Can feel grooves if not done properly

**Dye Sublimation:** The lettering is formed using a dye, which seeps into the plastic keycap.

- + Lasts a long time
- + No grooves or inconsistencies
- Expensive process
- Only able to print letters darker than the plastic

**Double-Shot Injection Molding:** A two-step process in which a legend is first molded in plastic. The insert created is then put into another mold, while another piece of plastic is inserted under it and combined using heat.

- + Zero wear
- + No feel
- Expensive
- Rare



# AND THE BEST MECHANICAL GAMING KEYBOARD IS...



## ROCCAT RYOS TKL PRO

The Roccat Ryos TKL Pro gets our nod of approval here, although it was a close race with the Logitech G910 Orion Spark. In the end, the Roccat keyboard won us over. If the Romer G system changed the game significantly, it would've been another matter, but the truth is, other than the stem and keycaps, the Romer G switches on the Logitech keyboard feel similar to the Cherry MX ones. On top of that, getting replacements for the keys might prove problematic since the switches are proprietary.

Gimmicky lighting aside, what really did it for the Ryos TKL Pro is the Easy Shift [+] function. Custom physical keys are fine and dandy, but they take up space on a keyboard. The Easy Shift [+] function only takes up one key and makes every other key have an alternate function without adding more stuff. It might be the smallest and lightest keyboard in our shootout, but it offers the most in terms of performance, customization, and comfort. Here, less is indeed more.



FEATURE

# WHAT MAKES YOUR SMARTPHONE SMART?

It's often said that even the cheapest smartphone today is more powerful than the computers NASA used to land Apollo 11 on the moon in 1969. From octa-core processing to wireless charging and quantum IPS displays, just how much do you know about the only gadget you never leave home without?

Text by **James Lu + Koh Wanzī** Art Direction **Ken Koh**







PICTURE: FREPIK.COM

## WHAT'S THE HIGHEST RESOLUTION THE HUMAN EYE CAN SEE?

The display is one of the most important features of any mobile device; after all, you spend most of your time staring at it. Display resolution has rapidly increased in recent years. Just five years ago, the standard resolution for a 4-inch display was 800 x 480 with 233ppi (pixels per inch). Today, the Samsung Galaxy S6 boasts a 5.1-inch QHD screen with a 2560 x 1440-pixel resolution. That works out to be 577ppi, but how many pixels do you really need?

The closest a human eye can focus is about 10cm. At this distance the smallest pixel size that can be distinguished would need to be 0.0116mm wide for a tiny percentage of the population, or about 0.029mm wide for the human average. Based on this, at a distance of 10cm, the very best eye would need a resolution of 2190ppi before it would no longer be able to determine individual pixels, while the average eye would need just 876ppi. Of course, no one holds their phone that close to their face. At the average reading distance of 30cm the best eye needs 720ppi to make pixels indistinguishable, while the average eye needs just 300ppi.

**THE VERY BEST EYE WOULD NEED A RESOLUTION WITH 2190PPI BEFORE IT WOULD NO LONGER BE ABLE TO DETERMINE INDIVIDUAL PIXELS, WHILE THE AVERAGE EYE WOULD NEED JUST 876PPI.**

## LCD OR AMOLED?

Resolution is just one aspect of display technology. The technology driving your display also plays a large part in determining how good your smartphone screen is.

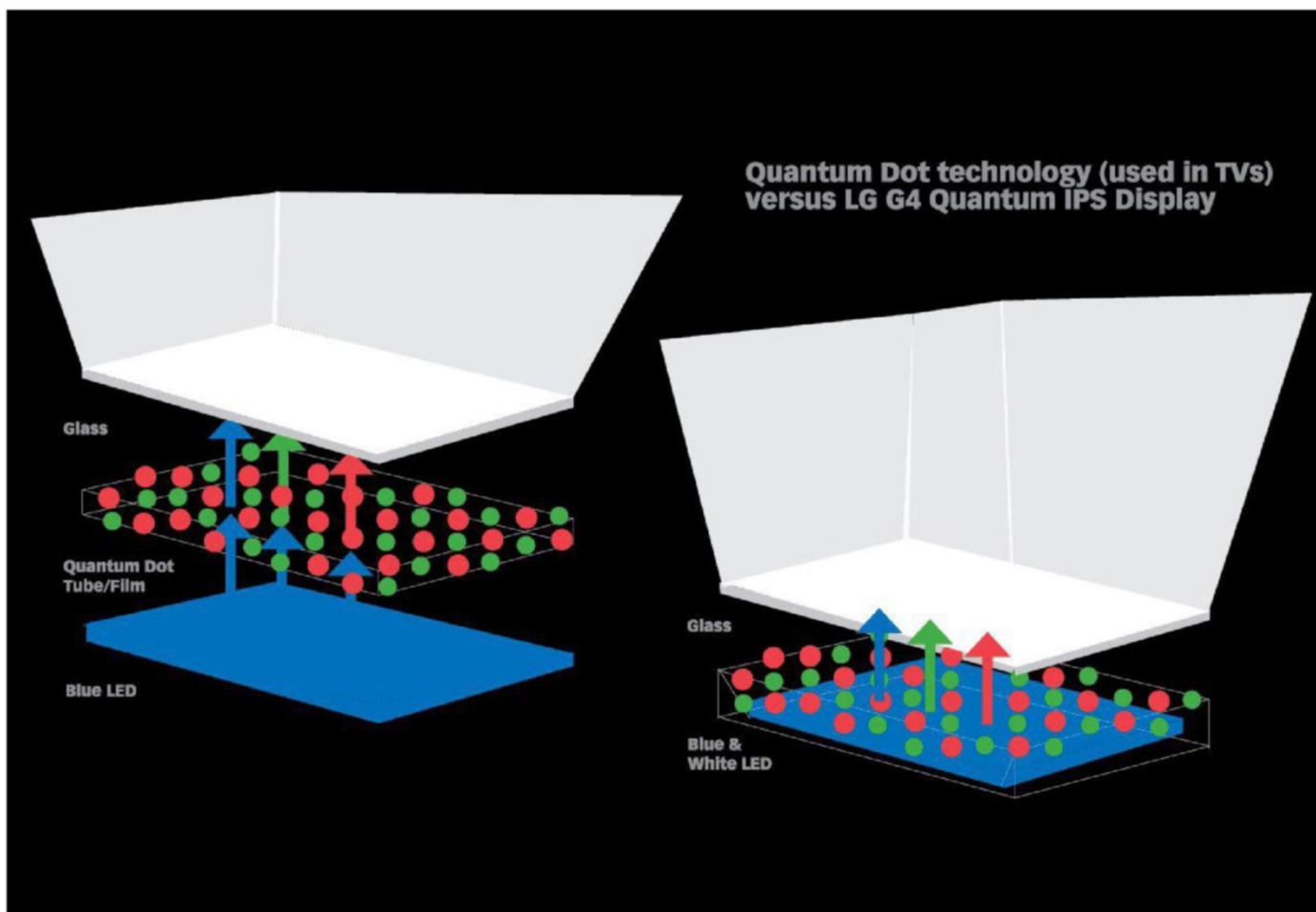
### LCD

The most common type of display used on smartphones today is LCD (Liquid Crystal Display). LCDs use a backlight which lights the entire screen, even the supposedly black areas. Liquid crystals are then manipulated via electrical charges to cover or not cover pixels as needed, thereby letting more or less light through. LCD screens are generally bright, with good color accuracy, but as the backlight is always on, they can never deliver true blacks, which generally end up looking slightly blueish in dark environments. Some LCD displays are differentiated as being either TFT or IPS. TFT stands for Thin Film Transistor, which makes the wiring of LCD screens more efficient by reducing the number of electrodes per pixel. IPS stands for In Plane Switching, and improves upon TFT by offering much wider viewing angles by keeping the liquid crystals parallel to the screen.

### Super LCD

HTC uses Super LCDs in its HTC One flagship phones. Standard LCD displays have an air gap between the outer glass and the display element, but with Super LCD, that gap is removed, which makes the screen brighter, reduces glare, and





improves power efficiency.

#### Quantum IPS LCD

The LG G4 uses a new LCD technology called Quantum IPS LCD. The technology is similar in principle to Quantum Dot LCD technology found in some high-end TVs, which uses a blue LED backlight and a film or tube layer to create reds and greens to display a wider and more vibrant gamut of colors. Quantum Dot screens are not suitable for smartphones, as they would require not only a larger bezel, but also a thicker panel. LG's solution is to use both a blue and white LED backlight, and instead of the tube or film layer, potassium- and nitrogen-based compounds work in combination with the blue LED to achieve red and green colors. This results in a 25 percent brighter display over traditional LCD displays, as well as the improved color and vibrancy of Quantum Dot technology, without any of the associated thickness.

#### AMOLED

AMOLED stands for Active Matrix Organic Light-Emitting Diode. Rather than a single backlight, AMOLED displays use millions of individually controlled organic-LED light sources. The brightness of each LED pixel is controlled by the current provided through the backplane transistor, which is adjusted via the transistor's gate voltage. The AM part of the name stands for active-matrix, which simply refers to the switching transistor technology used to control each LED pixel. AMOLED displays can also provide

high-accuracy colors, and they also have an advantage against LCD displays by providing a wider contrast ratio with true blacks by dimming individual pixels. This can also save battery life. However, peak power draw for high brightness levels is often higher than LCD displays, and AMOLED displays can also suffer from problems with organic-LED degradation over time, which can lead to burn-in and color loss over parts of

the screen.

#### SUPER AMOLED

Super AMOLED is a technology used by Samsung where the touch digitizer is built into the display rather than in a separate layer on top of the pixels. This has the added benefit of reflecting less light, increasing touch sensitivity, and allowing slightly higher peak brightness.



## SYSTEMS ON A CHIP

Smartphone progress is often measured in millimeters – more precisely, how many millimeters companies can shave off their next flagship device. To cut down on weight and size, manufacturers have taken to integrating and optimizing as many parts of a computing system as possible onto a single chip.

In theory, a System on a Chip (SoC) would integrate everything, ranging from the CPU and GPU, to memory, storage controllers, and even LTE modems. Some SoCs also include smaller co-processors that perform functions like video encoding, decoding, and image processing.

However, not all SoCs are created equal. Smartphone SoCs today primarily utilize either one of two architectures: ARM or Intel. ARM typically delivers high performance and good power efficiencies, so the bulk of processors today use ARM-based architectures; Qualcomm's Snapdragon, Apple's A-series, and Samsung's Exynos processors all draw on ARM CPU cores or instruction sets.

On the other hand, Intel's dominance in the desktop processor market isn't reflected in the mobile space. Intel has adapted its x86 desktop architecture for mobile SoCs, but so far, it hasn't been able to match ARM for power consumption on the same fabrication process. Last year's 28nm Snapdragon 805 is roughly on par with 22nm Intel Silvermont Atom processors in terms of thermal properties. Intel x86 also differs from ARM in terms of how individual instructions are handled to balance power consumption. In a nutshell, ARM uses Reduced Instruction Set Computing (RISC) while Intel uses Complex Instruction Set Computing (CISC). RISC instruction sets tend to be more granular while CISC's are larger and more complex.

Each RISC instruction translates into a single operation for the CPU to perform, but CISC instructions are expressed as a broader idea for the CPU to execute in multiple, smaller steps.

To put things simply, RISC has more efficient instruction decoding, as it is closer to CPU microcode operations. Nevertheless, some argue that CISC could gain an edge as smartphones handle increasingly complex computations. However, we can no longer arbitrarily attribute raw performance to Intel x86 and power efficiency to ARM – the gap between both architectures is narrowing, and they both have much more in common today than when they first started out.

PICTURE: APPLE

## MORE POWER

Regardless of whether your phone houses an SoC based on Intel x86 or ARM microarchitecture, chances are it uses a multi-core processor. If you think octa-core sounds like a lot, wait till you hear that MediaTek recently announced plans for a ten-core SoC, the Helios X20. Multi-core processing helps smartphones cope with a multitude of demanding tasks like 4K video recording and performance-intensive 3D games, all while remaining within an acceptable thermal envelope.

A good example to illustrate how multi-core processing works is the octa-core Qualcomm Snapdragon 810, which is found on flagships like the HTC One M9 and Xiaomi Mi Note Pro. Like the Exynos 7420, the Snapdragon 810 uses ARM's big.LITTLE heterogeneous computing core

**WITH MULTIPLE CORES, EACH CORE CAN BE ASSIGNED INDIVIDUAL TASKS WHEN NEEDED TO HELP SPEED UP SIMULTANEOUS PROCESSING.**

management scheme for its four Cortex-A57 and four Cortex-A53 cores. The more powerful Cortex-A57s are the "big" cores, while the energy-efficient Cortex-A53s are the "LITTLE" part of the equation.

With multiple cores, each core can be assigned individual tasks when needed to help speed up simultaneous processing. Under low loads, the cores can also slow down, thus helping to conserve

power. Any combination of the eight cores in the Snapdragon 810 can be operational at any one time, depending on the system's workload. While the phone is sleeping, the low-power Cortex-A53 can handle background processes efficiently. If you suddenly wake your phone to play a game, the Cortex-A57 ramps up independently to handle the new workload without interrupting the A53 core.



## Just how waterproof is your smartphone?

Some smartphones, such as Sony's Xperia Z range, are built to be resistant to dust and water. But just how resistant are they? All devices are rated on the Ingress Protection (IP) two-digit scale, for example the Xperia Z3 is rated IP58. The first digit indicates the level of protection against solid objects, including dust, while the second indicates how resistant the device is to water.

### Dust

- 1 - Protected against solid objects larger than 50mm in diameter
- 2 - Protected against solid objects larger than 12.5mm in diameter
- 3 - Protected against solid objects larger than 2.5mm in diameter
- 4 - Protected against solid objects larger than 1mm in diameter
- 5 - Protected against dust; limited ingress
- 6 - Complete protection against dust

### Water

- 1 - Protected against condensation or dripping water falling vertically.
- 2 - Protected against spraying water when tilted up to 15 degrees vertically.
- 3 - Protected against spraying water when tilted up to 60 degrees vertically.
- 4 - Protected against splashing water from any angle.
- 5 - Protected against low pressure water stream from any angle.
- 6 - Protected against high pressure water stream from any angle.
- 7 - Protected against water immersion. Immersion for 30 minutes at a depth of up to one meter.
- 8 - Protected against continual water submersion in most water conditions.



PICTURES SONY + APPLE

## BIOMETRICS CHANGE THE WAY YOU INTERACT WITH YOUR PHONE

Remember when all you could do with your phone was call, message, and try not to eat your own tail on Snake? Today, phones are crammed with an array of biometric sensors, able to authentic your fingerprints, monitor your heart rate, and even count your steps.

When it comes to fingerprint sensors, you can thank Apple for kickstarting that trend. Apple's Touch ID first appeared on the iPhone 5s, and uses a 500ppi capacitive touch sensor that is capable of 360-degree readability and also eliminates the need for a swipe gesture. The sensor is, in turn, surrounded by a steel ring that detects your finger and tells the scanner when to begin scanning for a print. This helps conserve power, so the sensor isn't always waiting to detect a print. A tough sapphire lens protects the sensor, ensuring that scratches won't interfere with the sensor's ability to read your print.

**A TOUGH SAPPHIRE LENS PROTECTS THE SENSOR, ENSURING THAT SCRATCHES WON'T INTERFERE WITH THE SENSOR'S ABILITY TO READ YOUR PRINT.**

After scanning your finger, information about your print is temporarily stored in a secure enclave for analysis and matched against the data stored on your iPhone. This data is actually a mathematical representation of your print, which resides in a secure section of the A7 SoC that is not accessed by iOS. To further bolster security, Apple says that it doesn't store images of your actual print on device memory or the cloud. Looking forward, the next big jump in fingerprint scanner technology seems to be ultrasonic scanning, which uses soundwaves to capture a 3D scan of your fingerprint. Qualcomm is currently developing the technology, which is said to be able to work through glass, metal, and plastic, and unlike Touch ID, will continue working regardless if your finger is dirty, greasy, or wet.

Many smartphones include a heart rate monitor, which is often used with a variety of pre-loaded fitness apps to help users get more utility out of the sensor than just figuring out what their pulse is. These sensors work by using an LED light that illuminates the pulses of blood as it moves through your finger. The sensor then measures these pulses and makes a calculation for your heart rate per minute.

If you don't want to get a dedicated fitness band to count your steps, your phone can do that for you, too. Many modern smartphones like the iPhone 6 and Galaxy S6 use combinations of the phone's various sensors to count your steps. The phone's accelerometer detects non-gravitational acceleration of your phone, which allows it to measure changes in velocity when you walk around with the phone in your pocket.

Your phone can then leverage on data from the accelerometer and combine that with GPS information to get a more accurate reading of the number of steps you've taken. Some phones like the old Google Nexus 5 even have a dedicated pedometer to calculate your steps with greater precision.



# WHY SMARTPHONE CAMERAS HAVE REPLACED DIGITAL COMPACT CAMERAS

Whether you're taking photos of people, landscapes, or food, a good quality camera on the back of your smartphone is more important than ever. For many people, smartphone cameras have replaced digital compact cameras as their go-to device for everyday photography.



## Sensor and Lens:

### Bigger is always better

All smartphone cameras are made up of two main components: the sensor and the lens. Almost all smartphone cameras use CMOS (complementary metal-oxide semiconductor) sensor technology. A CMOS sensor is essentially a complex integrated circuit that typically includes photodetectors – the key component that captures light – plus amplifiers, transistors, and processing hardware. When light hits the photodetectors, the sensor captures information about the light hitting them. This information gets converted into a digital signal relating to the brightness of the individual light photons. To get color data, an RGB filter is layered over the array of photodetectors, and a software algorithm produces the final, full-color image. What differs from smartphone to smartphone is how large the actual sensor is. Larger than average camera sensors, such as the 1/2.6-inch sensor used in the LG G4, can fit in more photodetectors, which means the sensor receives more light information. More information means better dynamic range, less noise, and improved low-light performance.

The second component is the lens. The lens focuses light onto the sensor so that the image is in focus, and is actually a collection of multiple plastic or glass elements, each with a specific function in focusing the light onto the sensor. Generally speaking, the more elements a lens has, the better the image quality will be. Most high-end smartphones use five element lenses, although some, like the LG G4, have six. The lens elements work in conjunction with an aperture, which is a hole before the sensor that the focused light travels through. The size of the hole determines how much light passes to the sensor. The larger the aperture, the more light hits the sensor, which means faster shutter speeds, lower ISO, and less noise and image processing. Larger apertures also have several other benefits. A very wide aperture, such as the LG G4's f/1.8 lens, allows for a shallower depth of field, which can tastefully blur out the background, helping you isolate your subject. Most importantly, larger apertures result in clearer, sharper shots with more detail in dark environments.

## Autofocus

A great sensor and lens aren't much use if your photos aren't sharp and in focus, or if you miss the shot because your camera was too slow to focus. Here's where autofocus comes in. Smartphone cameras generally focus using contrast detection, which is entirely done on the software side by shifting the lens until there's maximum contrast between adjacent pixels. Some smartphone cameras such as the iPhone 6 and Samsung Galaxy S6 also use phase detection autofocus, which compares the actual light received by the sensor to fine-tune the focus.

LG uses a completely unique autofocus system, which we first saw in the LG G3, and has since been improved upon in the G4. LG's system uses a low-power laser which emits pulses of infrared light, which are then bounced back to the laser sensor. The sensor continuously measures the round trip travel times for each infrared pulse beam, establishing a precise range to the subject. After the image processor receives the measurements of exactly how far away the object is, it locks in the respective focus depth. This all happens in a fraction of a second, 0.276 seconds to be precise, which makes the LG G4's laser focus the fastest autofocus system on any smartphone camera.

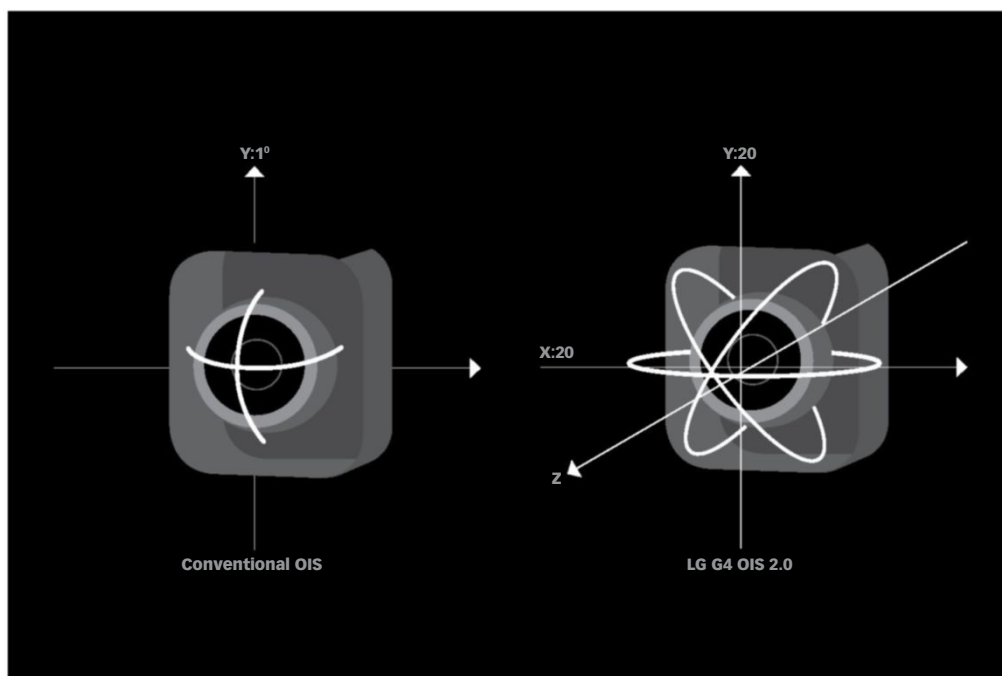
## Optical Image Stabilization

Smartphones are almost always used handheld when taking images, which is why image stabilization is crucial. There are two main forms: optical image stabilization (OIS), which is hardware-based, and electronic image stabilization (EIS), which is entirely done in software. OIS is always preferred as it gives better results, but is more expensive and more complex to integrate.

OIS works by placing the camera lens module inside a stabilized rig. Using information from a gyroscope placed near the camera, the entire rig is shifted with electromagnets to counteract the physical movement of the device. This keeps the optical elements in the same relative position.

Most OIS systems work on dual X and Y axes. LG's G4 is the only phone with a third Z axis, which also compensates for front and back movement.

**A GREAT SENSOR AND LENS AREN'T MUCH USE IF YOUR PHOTOS AREN'T SHARP AND IN FOCUS.**



Advanced image stabilization technologies that compensate for more movement axes are now found on mobiles.



# WIRELESS CHARGING EXPLAINED

Thirty years ago, wireless telephones were almost unheard of. Now, some smartphones don't even need a wire to charge them. Palm was the first company to commercially introduce wireless charging with its Touchstone Wireless Charging Dock back in 2009. Since then, hundreds of devices, from Microsoft's Lumia 930 to Samsung's Galaxy S6, have hit the market with wireless charging capabilities.

There are two types of wireless charging technology commonly in use today: Inductive and Resonance.

## Inductive Charging

Electromagnetic Inductive charging works by using an electromagnetic field to transfer energy between two objects: the charging base or plate, and the device itself. The charging plate is connected to a power supply, and has a coiled wire inside it. Anytime electrical current flows through a wire, a small magnetic field is created around that wire. Coiling the wire around itself many times amplifies the magnetic field – the more loops in the coil, the larger the magnetic field. The device to be recharged also has a smaller coiled wire inside it. When this wire is placed into the magnetic field generated by the charging plate, an electrical current is induced in the wire. The induced current can then be modified using simple electrical components to produce a stable power supply that can charge the device's battery. The limitation of inductive charging is that the charging and receiving coil must be in very close proximity, due to the small size of the magnetic field. Most wireless charging smartphones today use Inductive charging.

Anytime electrical current flows through a wire, a small magnetic field is created around that wire. Coiling the wire around itself many times amplifies the magnetic field – the more loops in the coil, the larger the magnetic field.

TRANSMITTER COIL

The charging plate is connected to a power supply and has a coiled wire inside it.

RECEIVED COIL

The device to be recharged also has a smaller coiled wire inside it. When this wire is placed into the magnetic field generated by the charging plate, an electrical current is induced in the wire.

Every wirelessly charged device consists of two components, a charging base or plate, and the device itself.

## Resonance Charging

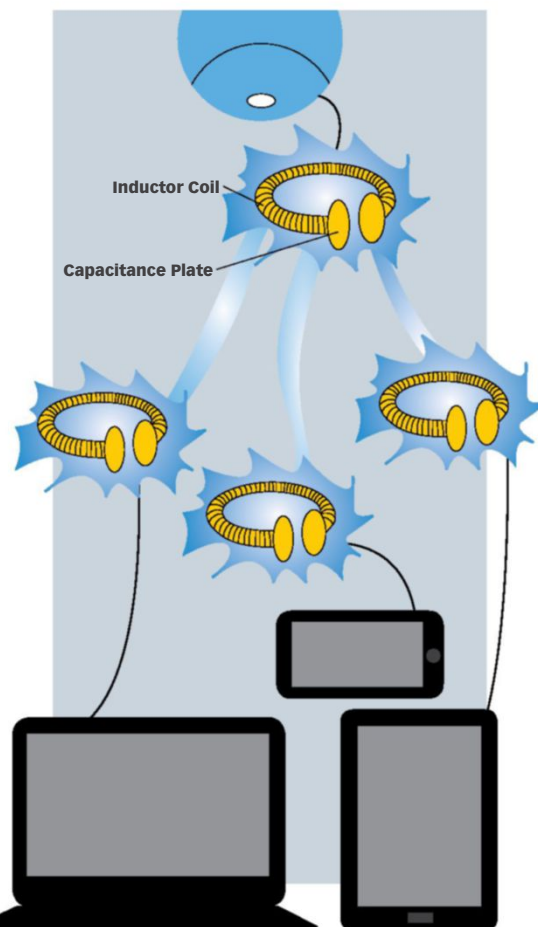
In 2007, a team at MIT reported that they had discovered an efficient way to wirelessly transfer power between coils separated by a few meters. The team theorized that they could extend the distance between the coils by adding resonance to the equation.

Resonance can be thought of as the specific frequency that causes a particular object to naturally vibrate. Resonant frequency is what can cause a wine glass to shatter when a note with a specific frequency is played next to it; the resonance causes the glass to vibrate, shattering it.

The MIT team discovered that induction can take place between two coils if both the charging coil and the receiving coil share the same resonant frequency. Using this

principle, they were able to successfully power a lightbulb over two meters away from its charging coil. Resonance charging in smartphones uses the same principle, and greatly extends the wireless charging range. This also lets resonance charging plates operate through tables or other objects. The added range also easily allows for multiple devices to be charged at the same time, as long as each shares the same resonant frequency. Resonance charging is a fairly new technology, but is expected to overtake Inductive charging in the next few years. **HMM**

**THE LIMITATION OF INDUCTIVE CHARGING IS THAT THE CHARGING AND RECEIVING COIL MUST BE IN VERY CLOSE PROXIMITY.**





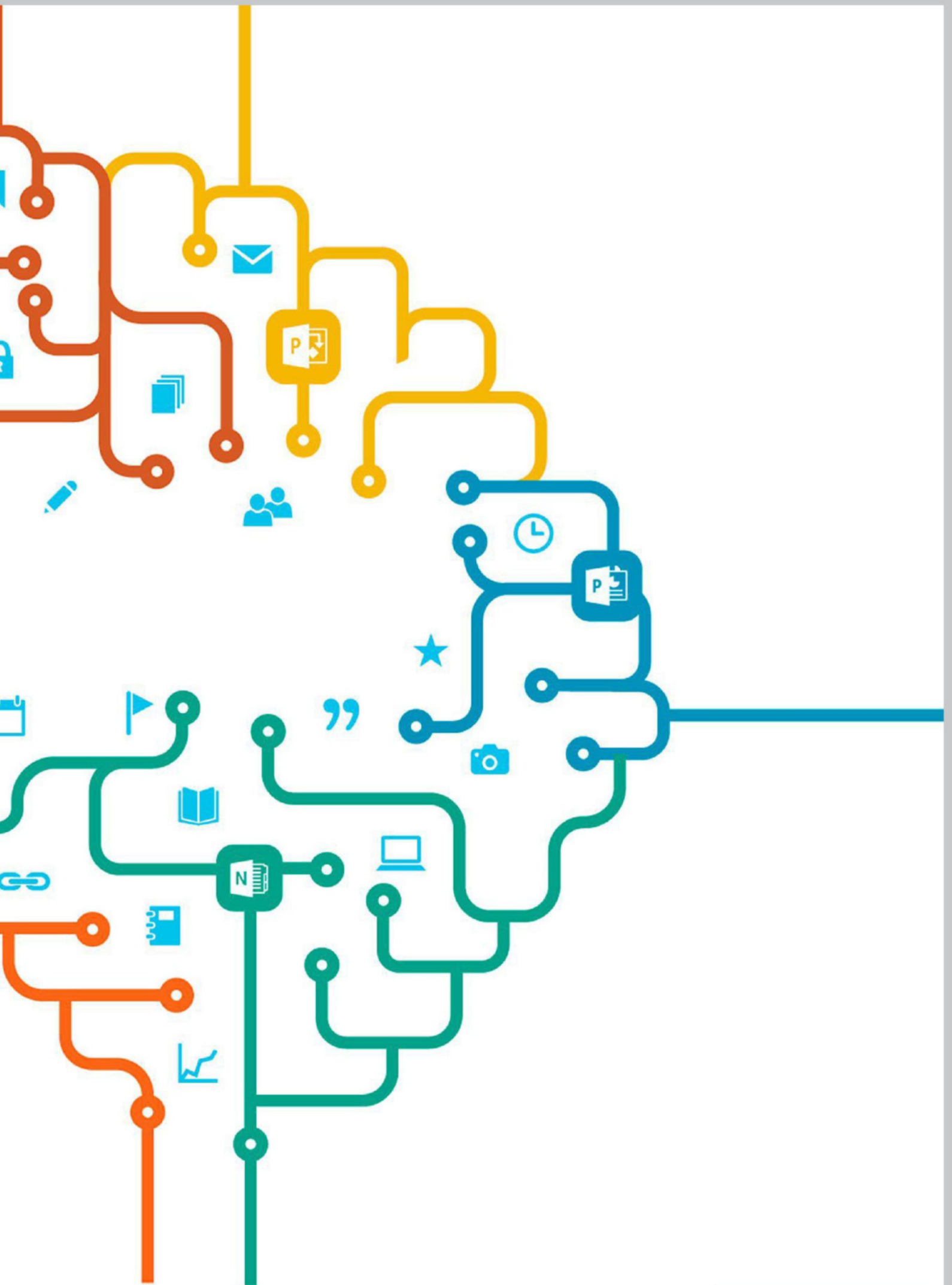
LEARN

# THE MOBILE TAKEOVER

■ There's no escaping the fact that our lives are going to be more mobile than ever. In this issue's Learn, you'll get a glimpse of what to expect from Microsoft's next-generation operating system, how to use that fancy stopwatch on your analog wristwatch like your grandfather used to do, how to take advantage of your advanced smartphone camera, and the intricacies of high-resolution audio.

Text by *Team HWM*  
Art Direction by *Ken Koh*





# MICROSOFT BUILD 2015: 6 THINGS YOU NEED TO KNOW

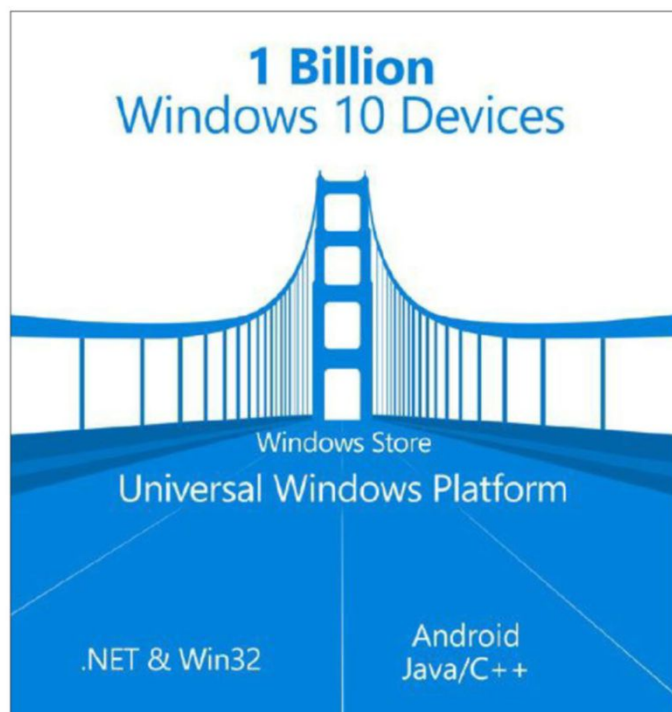
While Microsoft's annual Build conference is a developer-centric event, many of its announcements have a direct impact on consumers like you. Here are some of the latest Windows 10 developments worth knowing about.

by Ng Chong Seng

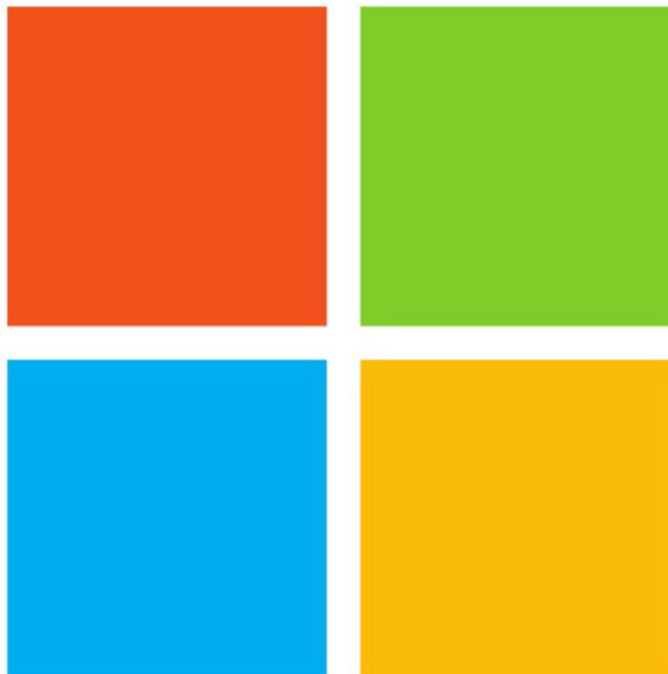
## REWORKED ANDROID AND IOS APPS ON WINDOWS 10

Microsoft has announced four toolkits so that developers can easily bring their apps to the Windows Store, regardless of where their code base originates from. The two that would impact mobile users the most are codenamed Project Astoria and Project Islandwood. The former lets Android developers reuse almost all existing Java and C++ code to create apps for Windows 10 phones; the latter lets iOS developers convert their apps to universal Windows apps easily in Visual Studio.

Not interested in mobile? Another toolkit no less important is Project Centennial, used for bringing classic .NET and Win32 apps to the Windows Store. One major developer that's already onboard is Adobe, who's porting Photoshop Elements. Expect more apps on the Windows Store in the near future.



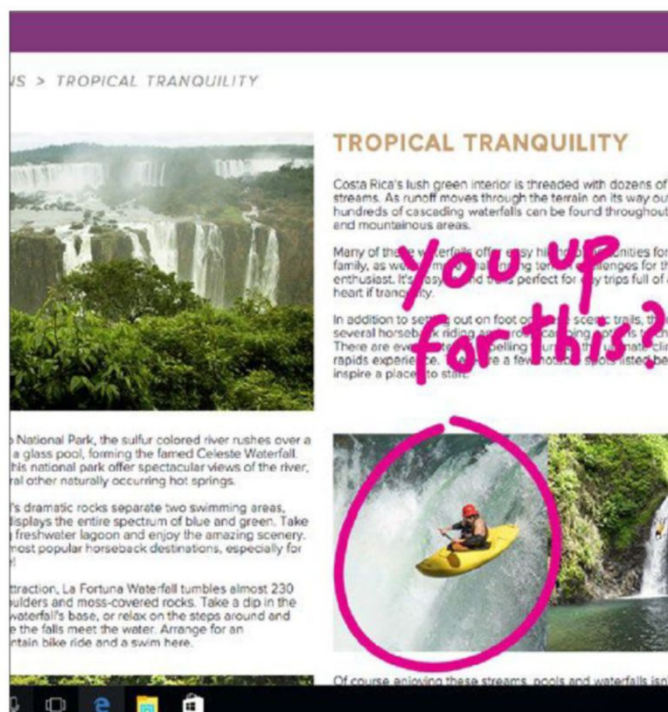
With these toolkits, we can look forward to an app boom in the Windows Store.



## WINDOWS 10'S NEW BROWSER IS CALLED MICROSOFT EDGE

Previously known as Project Spartan, the new default browser in Windows 10 has a confirmed name: Microsoft Edge. A universal Windows app, it will only support the new EdgeHTML rendering engine, which is optimized for modern websites and standards. There's also a note-taking mode whereby you can doodle or annotate on a webpage directly, a Reading Mode for distraction-free reading, a Reading List that supports offline reading and syncs across devices, and Cortana integration.

According to Microsoft, in both Octane 2.0 and JetStream benchmarks, Edge also outpaces other modern browsers like Chrome Canary and Firefox Alpha. And inline with Microsoft's Universal Windows Platform strategy, developers can turn websites into apps that leverage on unique Windows 10 features like Xbox Live achievements.



Microsoft Edge looks to be a fast and modern browser. Would you use it?



## CONTINUUM GIVES WINDOWS 10 PHONES DESKTOP POWERS

Continuum is a Windows 10 feature that allows you to move from one device to another with ease, as it handles UI transitions and adapts accordingly to the device. For example, if you are in tablet mode, the UI is optimized for touch; if you dock it to a keyboard cover, you get UI elements that are more suitable for a keyboard and mouse combo.

Continuum is coming to phones, too. When hooked up to a bigger display, the UI will become more desktop-like, and universal apps like Excel and PowerPoint can be controlled via keyboard and mouse, complete with shortcuts like copy and paste. Continuum for phones requires new hardware that can drive dual screens, which would be announced later.

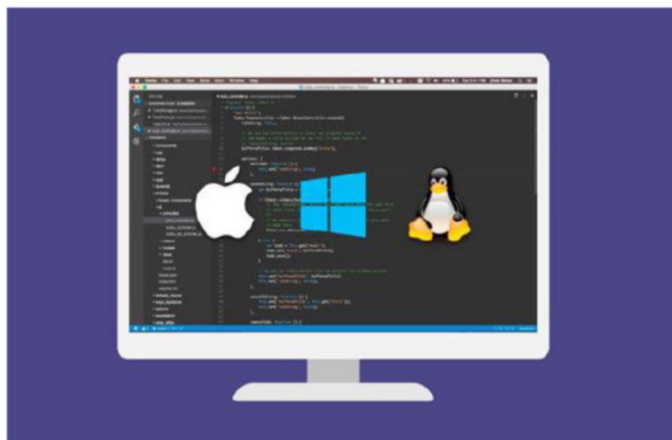


Continuum for phones wouldn't be possible if Microsoft didn't pursue its Universal Windows Platform strategy.

## VISUAL STUDIO CODE CROSS-PLATFORM CODE EDITOR

Want another piece of evidence that Microsoft is now platform agnostic? Visual Studio Code is a code-optimized editor for building and debugging web and cloud apps, and it runs on Windows, Linux, and OS X. Out of the box, it supports multiple languages with enhanced support for Node.js and ASP.NET 5, as well as Git and Visual Studio's features like IntelliSense intelligent code completion, and peek.

With Microsoft Azure as the backend and tools like Visual Studio Code, the Windows-only Visual Studio 2015, and Visual Studio Online, Microsoft aims to offer best-in-class tools for every developer, whether they're developing native or web apps, or SaaS (software as a service) offerings. Code is free and available for download now.

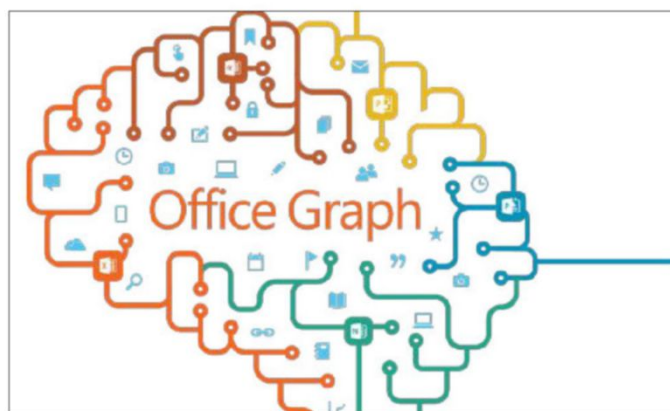


Visual Studio Code is the first cross-platform development tool in the Visual Studio family.

## OFFICE ADD-INS ARE GOING CROSS-PLATFORM AS WELL

At Build, Microsoft revealed more plans to help developers reach the 1.2 billion Office users out there. First up, there's a new Office Graph API to enable developers to tap into Office data and machine learning capabilities so they can layer third-party data to create new intelligent solutions.

Then there are unified consumer and commercial APIs across OneNote, Outlook, and OneDrive – in short, add-ins (or plug-ins) that work across Windows, Office apps for Android and iOS, and of course, the web. The idea of this cross-platform app integration is to enable users to complete a task without having to jump from one app to another. In addition, there's going to be a new, single API endpoint for all Office 365 data queries.



In essence, Office Graph is a big dataset with a framework that helps to make said data available to other apps.

## STAGGERED LAUNCH FOR WINDOWS 10

So far, Microsoft has only said that Windows 10 would be available "this summer" in 190 countries and 111 languages. If we were to take Microsoft literally, this would mean anytime between June 21 and September 23. AMD's CEO Lisa Su recently revealed that the OS would launch at the end of July, but we have our doubts, because looking at the preview builds, there are still several rough edges.

No exact launch date was announced at Build, but Microsoft VP Joe Belfiore did confirm that Windows 10 will arrive at different timings for different devices. Windows 10 for PCs will come first, most probably followed by Windows 10 for phones. HoloLens, IoT, Xbox One, and other devices will get their own version after that, according to their own schedules.



Windows 10 for PCs will be the first version to be released. Windows 10 for phones and other devices will come after that.

# WATCHES IN-DEPTH

How to use a chronograph

by *Kenny Yeo*

A chronograph refers to any watch with an integrated stopwatch. And with its sub-dials and pushers, the chronograph is quite possibly the most recognizable complication. It is probably also the most interactive, since wearers need to activate the pushers to start, stop, and reset the chronograph. As a complication, it is one of the most visually interesting, as one can actually see the seconds hand at work, zipping across the dial. This month, we explore chronograph complications, its history, importance, and how to use it.



## HISTORY OF THE CHRONOGRAPH

The earliest chronograph can be traced back to 1816, and its invention is widely credited to Louis Moinet, a French horologist. Among all the complications, the chronograph is widely regarded as one of the most challenging to design and manufacture, even if it looks deceptively simple. In fact, it was only 153 years later in 1969 that the first automatic chronograph was invented; automatic watches have been in existence since 1773.

Moreover, despite the large amount of chronograph watches in the market today, only a very small handful of brands can raise their hands and say that they have a completely in-house design and developed integrated chronograph. Most brands rely on either a third-party movement supplier or a chronograph module supplier.

Most chronographs have three sub-dials: one to count the elapsed hours and another to count the elapsed minutes, while the third one is usually the running seconds for timekeeping. The central seconds hand is usually used to track the elapsed seconds. The top pusher is usually used

to start and stop the chronograph, whereas the bottom pusher usually performs the role of resetting the chronograph.

There are three main types of chronographs, and they are the monopusher, flyback chronograph, and double chronograph.

Most chronographs have two pushers: one to start and stop timing, and another to reset. The monopusher chronograph reduces this to only a single pusher, and this function is often integrated into the crown itself, which makes for a very clean design. However, this also adds to the complexity of the movement.

A flyback chronograph is just like a regular chronograph, except that it does not need to stop and reset itself before it can start timing a new event. When the pusher is activated, the flyback chronograph will instantly reset itself and start timing a new event instantaneously.

A double chronograph is also known as a split-second chronograph. It has two seconds hands, one of which can be stopped at any instant while the other continues, allowing it to time two events of different durations.



PICTURES: BREITLING • PATEK PHILIPPE • OMEGA • VACHERON CONSTANTIN • CARRERA



## TACHYMETER

### Omega Speedmaster Dark Side of the Moon

To make the most out of the chronograph functions, most chronograph watches have special bezels with markings that can be used to tell additional information, and the most common type of bezel found on chronographs is the tachymeter.

The tachymeter is a scale that can be used to calculate the speed based on travel time. The tachymeter works using the formula  $T = 3600/t$  as its basis, where T is the tachymeter scale value and t is the time taken. Even though it is most commonly used to measure speed and distance, what this really means is it can actually be used to measure the average rate of any repeating event.

Here is an example: If you were traveling in a car and you knew the distance between each lamp post was 2km, and timing the time it took for the car to get from one lamp post to the next was 30 seconds, at 30 seconds, the tachymeter gives a reading of roughly 120. This means the car would cover 120 units every hour, which means it was traveling at 240km/h.

On the other hand, if the distance between each lamp post was 3.5km and it took the car 50 seconds to get from one lamp post to the next, then the tachymeter scale tells us that it would cover 72 units per unit, which means an average speed of 252km/h.

The tachymeter can also be used to calculate distance, but this is only if the speed is constant. Simply start the chronograph and wait until the seconds hand passes the known speed. So if a train was traveling at exactly 200km/h, when the seconds hand passes 18 seconds, a kilometer would have been covered.



## PULSOMETER

### Vacheron Constantin Harmony Chronograph

Chronographs with a pulsometer scale are also called a doctor's chronograph, because the pulsometer was designed to allow wearers to quickly determine the heart rate of a patient. The scale is usually calibrated for either 15 or 30 heart beats, and this would be clearly indicated on the dial. In the example used, the scale has been calibrated for 30 heart beats. So to use it, the wearer would search for a pulse and start the chronograph. The chronograph would be stopped once 30 pulses have been counted and the pulsometer scale would then indicate the heart rate; hence, if 30 pulses were counted at 15 seconds, this means that the patient's heart rate is 120 beats per minute.



## TELEMETER

### Tag Heuer Carrera Telemeter Cal. 18

The telemeter scale is an interesting one that was designed for use during war. It is usually found either on the outer side of the dial or towards the center, and is often calibrated for 20 kilometers. It was used in the first World War to help officers determine how far away the enemy artillery was. When an officer saw the flash of artillery fire, he or she would start the chronograph and stop it again when the sound of the fire was heard. Reading off the scale would indicate the distance of the firing enemy artillery. It can also be used to tell how far away a lightning strike is and just about any other event that can be both seen and heard. This all works because the speed of sound in air is relatively constant.





# 6 WAYS TO SHOOT FURTHER WITH THE LG G4

The LG G4 is more than just an advanced smartphone, it's also an advanced camera.

by Alvin Soon

■ LG's newest flagship smartphone is built around a state-of-the-art camera made for both the everyday user and the experienced photographer. The lens is fast, with a wide f/1.8 maximum aperture that captures more light.

The fast lens is paired with a high-resolution 16MP 1/2.6" sensor and a second-generation optical image stabiliser, which can correct for shake in three directions, instead of just two. The improved laser autofocus system makes sure you get the shot in focus, and the new Color Spectrum Sensor gives you accurate, true-to-life colors with improved white balance.

The G4 camera lets you shoot in Simple, Auto, or Manual mode. Simple lets you point and shoot, while Auto gives you more options to play with, but it's Manual mode that gives you much more flexibility when shooting, just as if you're using an advanced digital camera. Here are six ways you can use Manual mode to shoot further.

*See the Great, Feel the Great*

# LG G4



Shot with the LG G4





### SHOOT NIGHT SCENES WITH SHUTTER SPEED CONTROL

Whereas most other smartphones require a separate (and compatible) app to do this, the G4 lets you control shutter speed out of the box – up to 30 seconds per exposure. That means you can capture scenes like silky smooth water, city scenes with light trails, and fireworks in the night sky.



### CONTROL THE LIGHT IN ONE EASY STEP

How many times have you found yourself frustrated with a camera that insists on capturing a scene either too bright or dark? The exposure compensation control on the G4 works like the ones on advanced digital cameras, and it lets you easily make a scene brighter or darker simply by sliding the meter.



### GO FOR MOOD WITH WHITE BALANCE

The G4 lets you manually set white balance, so you can get accurate white balance just the way you see it. You can also adjust white balance for effect, adding a warmer or cooler cast to the scene, making it look and feel the way you want it.



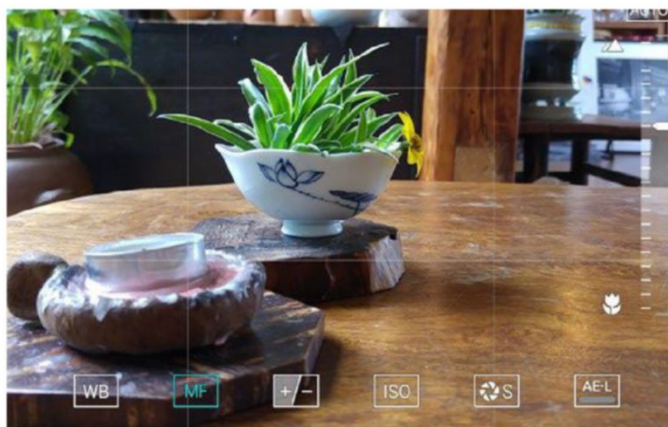
### HIGH DEFINITION, LOW NOISE

You can also manually set ISO in Manual mode, which you can use in two ways. When shooting handheld in low light, you can increase the ISO to make the sensor more sensitive to light and capture more of it. Or, because you can lengthen the shutter speed manually, you can then define a low ISO setting to capture the scene with maximum definition and minimum noise.



### CAPTURE IN RAW FOR MAXIMUM FLEXIBILITY

One of the limitations with JPEGs is that there's only so much you can pull and push during post-production. In a revolutionary move that caters straight to photographers, the G4 lets you save raw files, giving you more stops to work with afterwards. The file is saved in the universal DNG format, which means it works with most raw converters right out of the box.



### PRECISION FOCUS AT YOUR FINGERTIPS

Get precision focus when you need it with manual focusing on the LG G4. Adjust the slider to focus either up close or further away. With manual focusing, creative experimentation is fully in your control, and the results will definitely show.

# IN THE PURSUIT OF RESOLUTION

A quick guide to High-Resolution Audio and what you need to fully take advantage of it

by Marcus Wong

## THE BETTER TO HEAR YOU WITH

When we talk about digital audio recordings, the two main things that affect quality are the sampling rate and the bit depth used.

To understand how sampling rate affects the quality of music, think of someone trying to paint a picture. The sampling rate is the equivalent of the number of strokes the painter has. So, the higher the sampling rate, the more strokes he has, and hence, the more accurately he can paint; or, in this case, the more accurate the sound you hear will be. CDs use a 44.1kHz sample rate, but today's digital audio recordings can be easily be found in 96kHz and 192kHz or higher. So how much information does that capture?

Well, the typical CD sample rate of 44.1kHz can capture all frequencies below 22.05kHz – just over the generally accepted range of human hearing, which is listed as 20kHz. But the other reason why 44.1kHz was chosen is because at the time that the standard was set, storage was expensive, and a sampling rate above 44.1kHz would have meant less playing time than the just about adequate 74 minutes most audio CDs could provide.

Given that storage is immensely cheaper these days, a jump to twice the sample rate of 88.2kHz or 96kHz should be more than an adequate balance between storage space and accuracy, hence the reason why HRA tracks are generally found with sampling rates at 96kHz and above.



By now, I'm sure you've heard all about High-Resolution Audio (HRA), and you probably fall in either one of two camps.

You have the group who insists that HRA is nothing more than marketing spiel fabricated so music companies have a new way to charge a new premium, especially when most consumer audio equipment cannot possibly deliver the benefits of HRA.

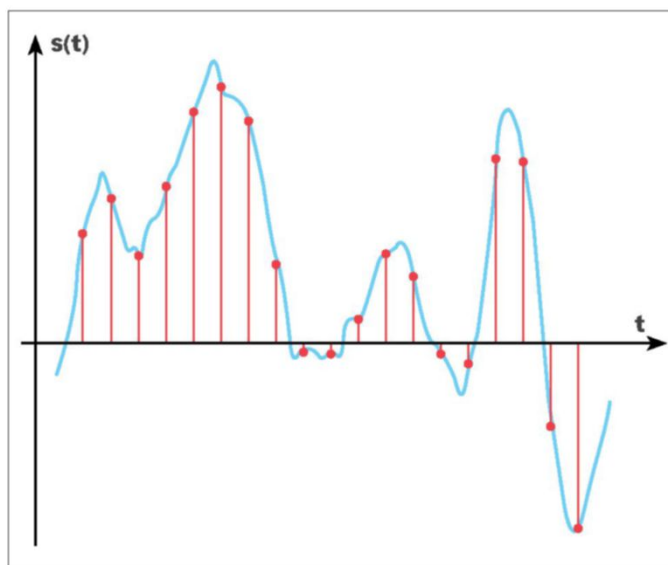
And then, there's the group that truly believes that you haven't heard music until you've heard it in HRA. This group truly feels like there's an audible, quantifiable difference between a normal track and one recorded in full high resolution, and that you haven't quite heard music until you've heard it in true high resolution. Both groups are right, and here's why.

## A NUMBERS GAME

Bit rate is what's commonly used to explain why HRA is better – the basic reasoning being that the more bits you have to describe a sound with, the more accurately you can do so.

Every bit added reduces the errors made in conversion from analog to digital, errors that manifest themselves as noise and distortion. So logically speaking, a well-recorded 24-bit audio clip should be able to reduce the distortion to well below what the human ear can hear.

However, those extra bits of information also need more computing power to store and process accurately, and John Siau of Benchmark Media Systems estimates that a 24-bit system needs 256 times the accuracy of a 16-bit system in order to make full use of the additional 8 bits, so it certainly will take a high-end system to properly render all the extra bits in a meaningful way.



The greater the sampling rate, the smoother the curve will be.

## BOTTLENECK: HARDWARE

Every element in the chain of an audio system brings with it an added element of noise and distortion. Audiophile-grade equipment has better components and the processing required to minimize these issues in order to bring out the best audio experience possible.

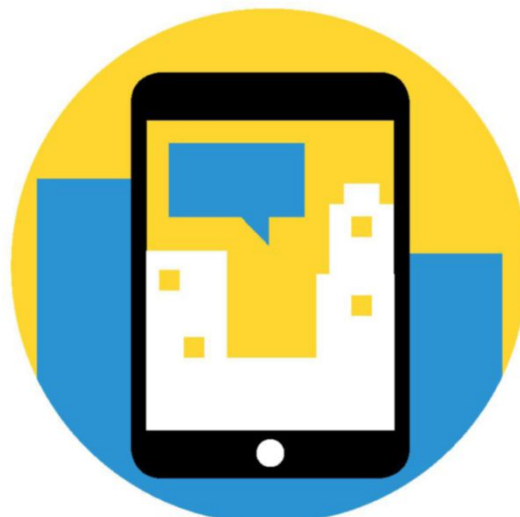
This is the reason why you probably can't hear any difference between HRA and SRA tracks on your portable media player or smartphone, even though it supports the playback of HRA formats.



# SPRUCING UP REALITY

by Koh Wanzî

Let's face it; reality is boring. But what if things could be different? Microsoft's HoloLens may be making the headlines, but we're guessing you don't have one just yet. Here are some apps that can help season your experience of the real world with some digital spice.



## WIKITUDE iOS, Android Free



Wikitude helps you experience the real world through a rich body of digital information. Let's

say you're hungry and feel like munching on a good T-bone steak; simply search for steakhouses in the app and fire up your smartphone camera to scan the world around you. A digital overlay will tell you when there are any nearby matches. You can also easily parse the world around you into categories, allowing you to narrow or widen your search of your surroundings accordingly. In addition, Wikitude comes with image recognition tools that enable you to access enhanced digital content like animations and videos embedded in print ads and packaging.

## INGRESS iOS, Android Free



You don't have to wait for Magic Leap to experience gaming in augmented reality. Ingress

is a massive multiplayer online augmented reality game that turns the real world into your virtual playground. The game has all the right elements to whet your appetite for grand battles and science fiction. Players can align themselves with either the Enlightened or the Resistance as they fight for control of a mysterious energy source called Exotic Matter (XM). In the Ingress universe, real-world locations become battlefields as players fight to collect XM and gain control of portals around buildings and landmarks to advance their cause.

## STAR WALK 2 iOS, Android Free, US\$ 2.99 (Premium)



Reality often means keeping your feet firmly grounded to the earth. So it's only fitting that the Star

Walk 2 augmented reality app lets you turn your gaze to the heavens. As you hold your phone up towards to the sky, Star Walk 2 uses your phone's built-in gyroscope to match the map on your screen to the stars. To find a particular star, constellation or planet, simply tap Search, and the app will point your gaze in the right direction. Star Walk 2 also assigns coordinates to constellations and other celestial objects, allowing you to abandon your earth-bound perspective and view objects from any vantage point in space. Now that's something out of this world!

## THEODOLITE iOS US\$ 4.99



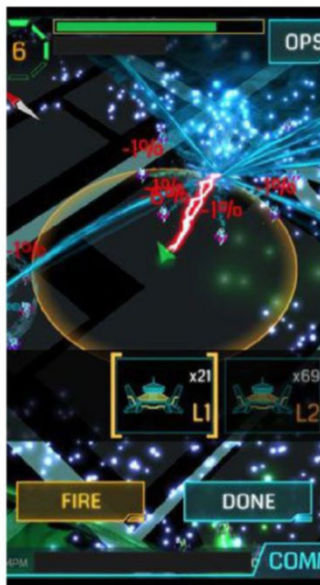
Digital photography is great, but we've all wished at one point or another to be

able to glean more information about our surroundings through a viewfinder. Theodolite is a multi-function viewfinder that combines a compass, two-axis inclinometer, rangefinder, GPS, navigational calculator, and more into a single app. The digital overlay is capable of displaying detailed information like angle of elevation, altitude, and display location in several different coordinate formats. The app also has collaborative functions – you can share your location with up to 20 people on Theodolite's map – making it perfect for group trips.

PICTURES WIKITUDE • INGRESS • STARWALK2 • THEODOLITE ILLUSTRATION IANCHONG



Wikitude's digital overlay allows you to discover more about the world around you.



Ingress turns the real world into a virtual battlefield as you choose a side and battle for control.



You can assign names to celestial objects and explore them from multiple perspectives.



Add a digital overlay to your camera's viewfinder to display information like compass direction and coordinates.



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# PAY ONLY PHP 1,536 FOR 12 ISSUES!

## STEP 1

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## STEP 2

YOUR DETAILS

Name	_____
Mailing Address	_____ _____ _____
Home No.	_____
Office No.	_____
Mobile No.	_____
Fax No.	_____
Email	_____
Gender	<input type="radio"/> Male <input type="radio"/> Female

### Education

- ☐ Primary
- ☐ Secondary
- ☐ College
- ☐ Graduate
- ☐ Post-graduate
- ☐ Others

### Industry

- ☐ Advertising/Media
- ☐ Automotive/Transportation
- ☐ Construction/Engineering
- ☐ Education/Training
- ☐ Finance/Accountancy
- ☐ Government
- ☐ Hospitality/Tourism
- ☐ Information Technology
- ☐ Legal
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- ☐ Manufacturing
- ☐ Medical/Health Care
- ☐ Military
- ☐ People/Real Estate
- ☐ Telecommunications
- ☐ Others

### TELL US MORE ABOUT YOURSELVES

### Occupation

- ☐ Executive Management
- ☐ General Management
- ☐ Administrative/Support
- ☐ Sales/Marketing/Distribution
- ☐ Call Center
- ☐ Self Employed
- ☐ College Student
- ☐ High School Student
- ☐ Others

### Monthly Income

- ☐ PHP 5,000-PHP 8,000
- ☐ PHP 8,001-PHP 12,000
- ☐ PHP 12,001-PHP 18,000
- ☐ PHP 18,001-PHP 25,000
- ☐ PHP 25,001-PHP 35,000
- ☐ PHP 35,001-PHP 50,000
- ☐ PHP 50,001-PHP 100,000
- ☐ PHP 100,001 and above

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## STEP 3

PAYMENT METHODS

☐ Cash ☐ Check

Enclosed is my check payment made payable to: **HardwareZone Philippines Corp.**

Name of Bank \_\_\_\_\_

Check Number \_\_\_\_\_

### TERMS AND CONDITIONS

- For inquiries and detailed instructions on how to subscribe to HWM, please contact HardwareZone Philippines Corp. at (632) 634-9179.
- Subscription rates may change without prior notice.

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# HAVE A SOUND BLAST!

WIN THIS!

Before the rainy season comes in full swing, take your music outdoors with the **MB Quart QUB Two**! Built with durability in mind, this Bluetooth speaker provides a shock-resistant rubber housing coupled with impeccable sound quality. Music playback lasts eight hours, and it even comes with a built-in noise-cancelling microphone for hands-free conference calls.

Does that sound good to you? You're in luck, because we're giving away QUB Two speakers to two lucky winners this month! All you have to do is like MB Quart Philippines' Facebook page at [www.facebook.com/MBQuartPH](http://www.facebook.com/MBQuartPH) and Macpower Philippines' Facebook page at [www.facebook.com/MacpowerPH](http://www.facebook.com/MacpowerPH), then answer the following questions:

- 1) What does QUB stand for?
- 2) Where did MB Quart originate from?
- 3) What makes the QUB Two shock-resistant?



Send in your entries via email to [editor.ph@hwzcorp.com](mailto:editor.ph@hwzcorp.com) together with your name, address, and telephone number. For more information about the product, visit [www.mbquart.com](http://www.mbquart.com).

The HWM Team congratulates Junnel Montelibano, the winner of the Reallook Screen Protector from our June issue contest.



**Terms and Conditions** • This contest is open to all HWM readers except staff of Hardware Zone Phils. Corp. • The qualifying period for this contest is until 31 July 2015. • Only the winner(s) of the contest will be notified via email. • Winners are given 15 days to respond to the notification email and another 15 days since replying to claim their respective prizes. Prizes not claimed within this period will be forfeited. • Selection panel's decisions are final and no correspondence will be entertained. • Only one (1) entry per reader in a particular contest. • Should the specified prize be no longer available (e.g., phased out), the contest sponsor may change the prize to another product of similar or equal value. • By sending in your entries, you are agreeing to the above-mentioned terms and conditions.



**MUSIC.DEFINED.**  
**QUB IS ON!**



## QUB | Series



### QUBone

- RDA BT2.1EDR chipset with 4 watt (3V) amplifier
- Control your Bluetooth™ device directly from the QUB speaker
- Voice Prompts - The QUB unit will tell you its status, "QUB is On" "QUB is Pairing".
- 5 hour playback time
- 20 meter bluetooth range
- USB Charging compatible



### QUBtwo

- CSR BT3.0 chipset with 6 watt (3.7V) amplifier
- 8 hour music playback
- 1050mAh lithium polymer (LIPO) battery
- Shock-resistant rubber housing
- 10 meter bluetooth range
- Active/Passive speakers
- USB Charging compatible



### QUBthree

- CSR BT4.0 chipset with 6 watt (3.7V) amplifier
- 10 hour run time
- 1250mAh lithium polymer (LIPO) battery
- Active-Passive speakers
- Conference Calls
- 20 meter bluetooth range
- Comes with On-the-Go tether cable
- USB Charging compatible



### QUBfour

- CSR BT4.0 chipset with 12 watt (7.4V) amplifier
- 12 hour music playback
- 1050mAh lithium polymer (LIPO) battery
- Voice Prompts - The QUB unit will tell you its status, "QUB is On" "QUB is Pairing"
- Active-Passive speakers
- Conference Calls
- 20 meter bluetooth range
- Delivers Intense sound and deep base



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1



2



3



4



5



6



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